

Western Industry

December 1953

This California solvent-extraction plant is able to squeeze nearly all the valuable oil out of cottonseeds . . . see page 26



SCANNING YOUR OPERATIONS

How to get mass production on job shop lots . . . Materials handling costs compared . . . Industrial engineering survey



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Engineering...the uniformity, dependable strength and light weight of Cabco containers are not accidental. They result from careful engineering. Thickness of slats, size of cleats, number of wires—even the spacing of the wires—all contribute importantly to the overall strength and superior protection of Cabco wirebounds. Experienced engineering is another reason why Cabco containers are the West's favorite—have been since 1883.

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276A



PRECISION-BUILT JET ENGINE PARTS ship in Cabco wirebounds, too. The mirror finish and fine-tolerance construction of Ryan Aeronautical Company afterburner exhaust cones must be jealously guarded during shipment. Cabco engineers designed a light but tough wirebound that not only gives real protection but materially reduces weight and saves crating time.

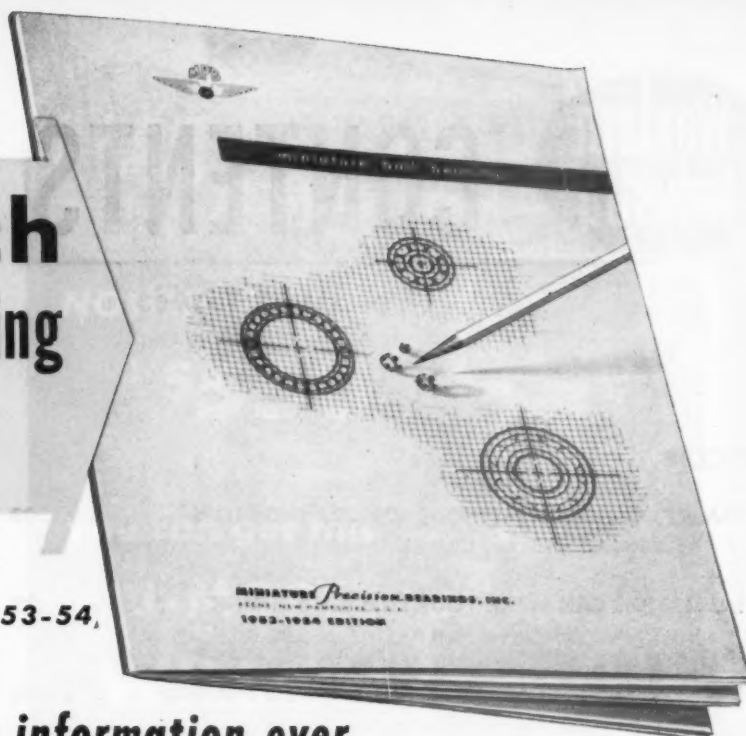
Cabco has solved many such container problems for manufacturers as well as for the West's great fruit, produce and poultry industries.

Why not ask the nearest Cabco man to check your present shipping container. His service costs you nothing, yet may save you much.

Cabco containers are a product of the California Barrel Company, Ltd., the West's foremost designer and manufacturer of wooden shipping containers

... which
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do you need?

new MPB catalog 53-54,



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- Speed-load charts with factor for easy conversion to any desired speed or load
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- Recommended shaft and housing fits; shaft and shoulder data
- Radial and axial clearance graphs
- Typical methods of using miniature ball bearings

For the designer of precision mechanisms this new 20 page MPB catalog offers practical solutions of problems involving miniaturization. As suggested by the partial list of contents above, MPB, originator and pioneer manufacturer of miniature ball bearings, has compiled for you the most complete and detailed information ever offered on this subject.

Request the new MPB catalog 53-54 on your letterhead . . . it may help develop a new product idea for you. Also request data sheet WI 10.



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If you've ever wondered about it — you'll find the answer in "MIGHTY MINIATURES" — 15 minute, full-color, sound film. "MM" is the story of Miniature Precision Bearings — with the accent on manufacturing processes and uses of MPB bearings. It's available to qualified groups. Write Engineering Dept., MPB, Inc., Keene, N. H.

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50c per Copy \$4.00 per Year

Published Monthly by

KING PUBLICATIONS

609 Mission Street
San Francisco 5, Calif.
Telephone YUkon 2-4343

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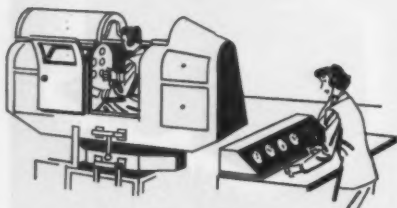
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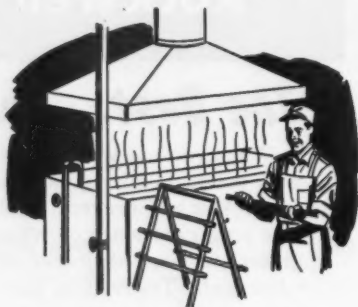
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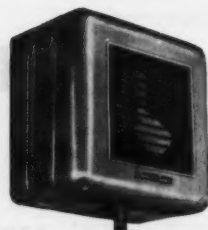
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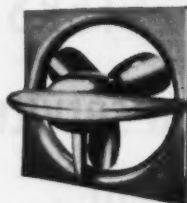
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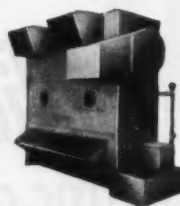
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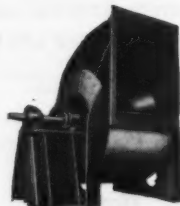
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Put out *MORE FIRE* with *LESS WATER*

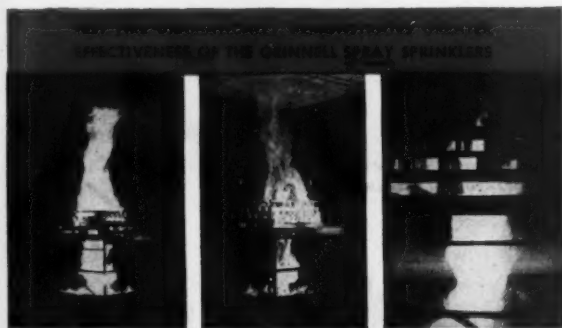
GRINNELL AUTOMATIC SPRAY SPRINKLERS

provide:

- better protection—the greater the hazard, the greater the improvement in protection
- improved water distribution—less water puts out more fire.
- more uniform coverage—from multiple operation or from a single sprinkler
- more effective ceiling protection—without wetting the ceiling
- lowered ceiling temperatures—no unnecessary sprinkler openings

why:

- cool fire gases to prevent fire from spreading—by the faster evaporation of the smaller water droplets
- control fire by producing an unburnable mixture of flammable vapors and water vapor
- dilute and diminish supply of flammable vapors with water vapor... evaporation of water removes heat, stops the distillation of the flammable vapors from solids—and from many liquids



Test fire is under way. Under the wood crib is a torch fed by a constant flow of gasoline which prevents extinguishment of the fire. The vapors distilled off from both wood crib and gasoline torch feed the flames which lick ceiling panel.

Heat opens Grinnell upright spray sprinklers. Flame column starts to thin out and break up under the attack of fine sprays. Water vapor from these sprays dilutes the flammable fire gases to extinguish the destructive flames.

Within 4 minutes, sprays have practically killed the fire. After 30 minutes, with torch still roasting wood crib, it was far from destroyed. Ceiling panel was only slightly flame-blackened—even though no water was directed against it.

Send for booklet describing Grinnell Spray Sprinklers in detail.

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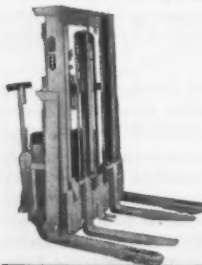
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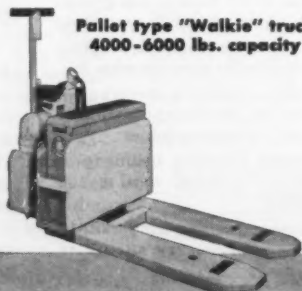


GOOD truck maintenance begins right in your own plant. The quick service features of MOTO-TRUC mean less down time . . . Less cost to you for repairs. Get the complete facts on the truck that offers the utmost in trouble-free operation . . . and remember . . . THERE'S A MOTO-TRUC FOR EVERY PURPOSE. Send for Bulletin No. 53.

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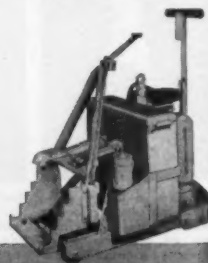
Pallet type "Walkie" truck
4000-6000 lbs. capacity



Platform "Walkie" type
4,000-10,000 lbs. capacity



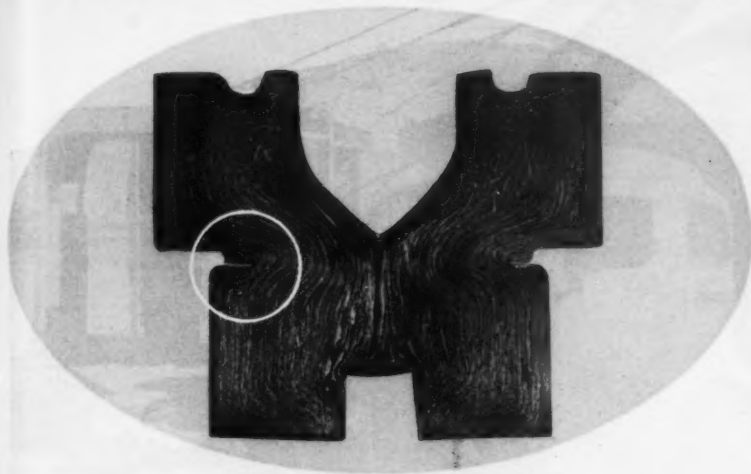
Grip-All Tractor



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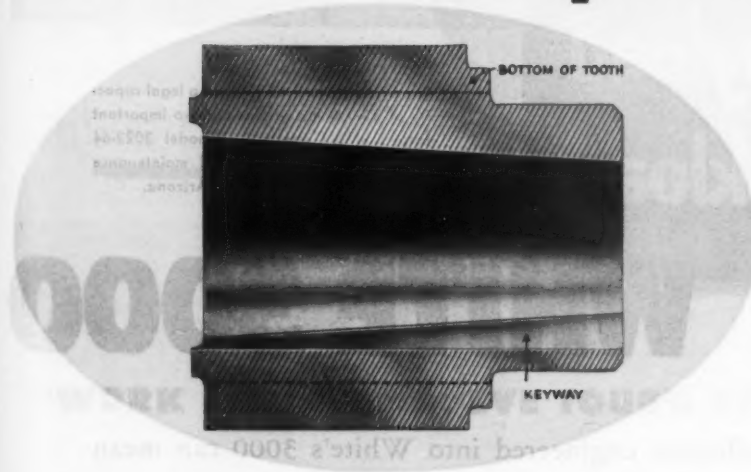
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AMFORGE CONTROLS GRAIN



A good example of how AmForge skill can control grain flow to develop maximum strength at key points. To increase the quality of the teeth in the small end of this double-gear, AmForge used small stock (to increase "working") AND put in a "cold-shut" or lap between the two gears. Note the ideal grain flow in this etched cross section. The grain dips as it passes inside the "cold-shut" and swells out to follow the contours of both gears.

for a better quality forging



Another instance of grain flow control. Here AmForge twisted the bar stock before forging, to bring the grain flow at approximately a 45° angle across the deeply cut keyway. Wall strength was greatly improved without altering the OD-ID dimensions, and breakage in service was eliminated. This is just one example of how AmForge experience can be a real value to industry.



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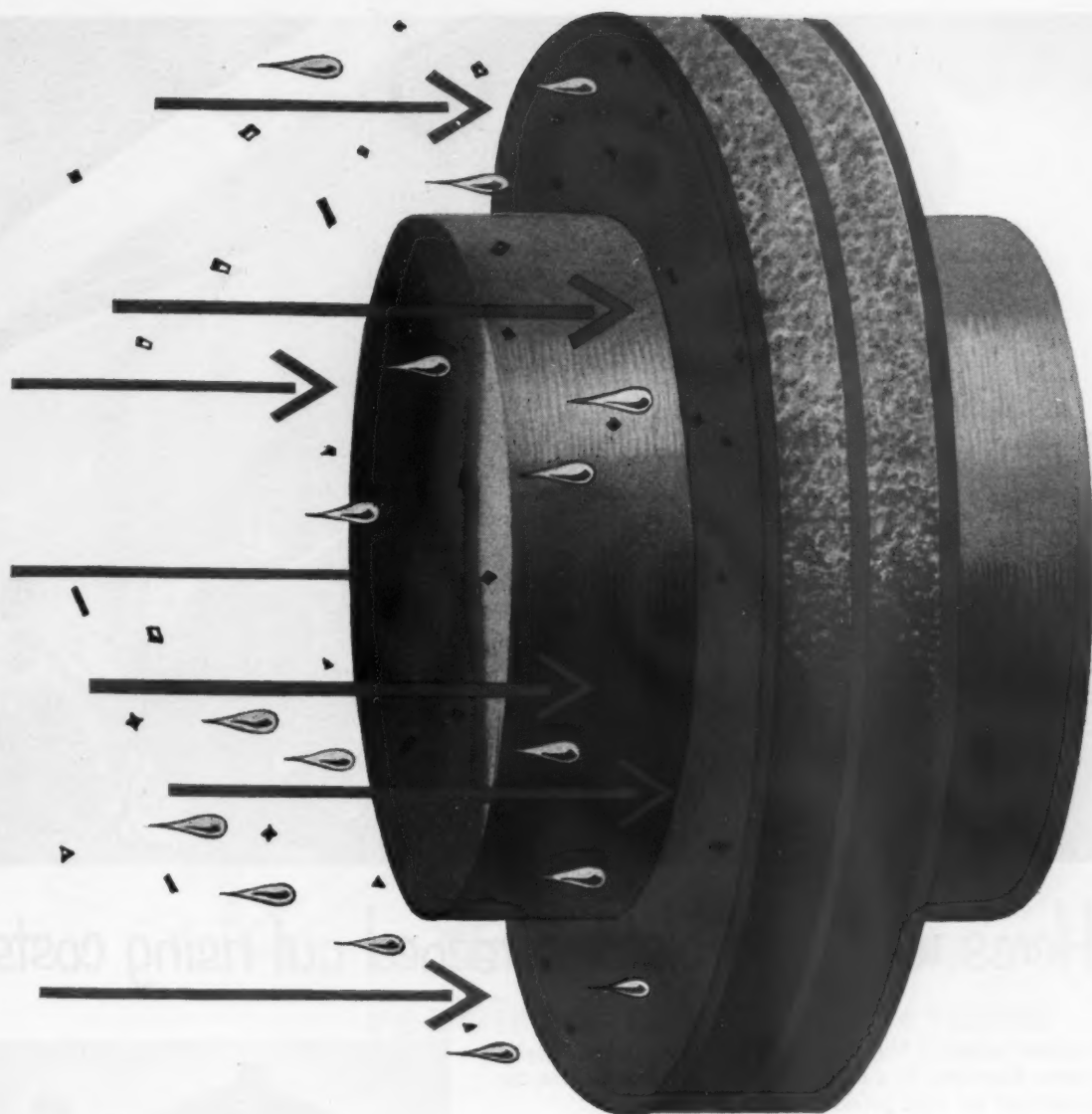


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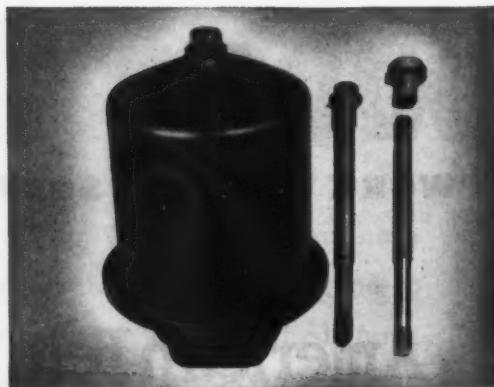
Here's where Purolator screened out rising costs

● Purolator makes oil filters for a prominent auto maker. They're top-notch filters that do a tough job well. Purolator and the car manufacturer are both proud of them.

Not long ago an RB&W "fastener engineer" got loose in the Purolator plant—just when company production executives were looking for a way to lick rising costs. He noticed that the Purolator filter was being assembled with a two-piece fastener made slowly and laboriously on a screw machine.

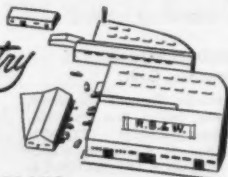
Our man told the Purolator people about RB&W's batteries of cold-forming machines. Purolator wanted to know more. Now their filter is assembled with a one-piece RB&W fastener that costs far less to make and assemble.

Chances are you can find a stage in your operations where RB&W "fastener engineering" can help you keep costs in line. As a leading manufacturer of all kinds of fasteners, we're always able to recommend and supply the right ones for all your needs. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N. Y.



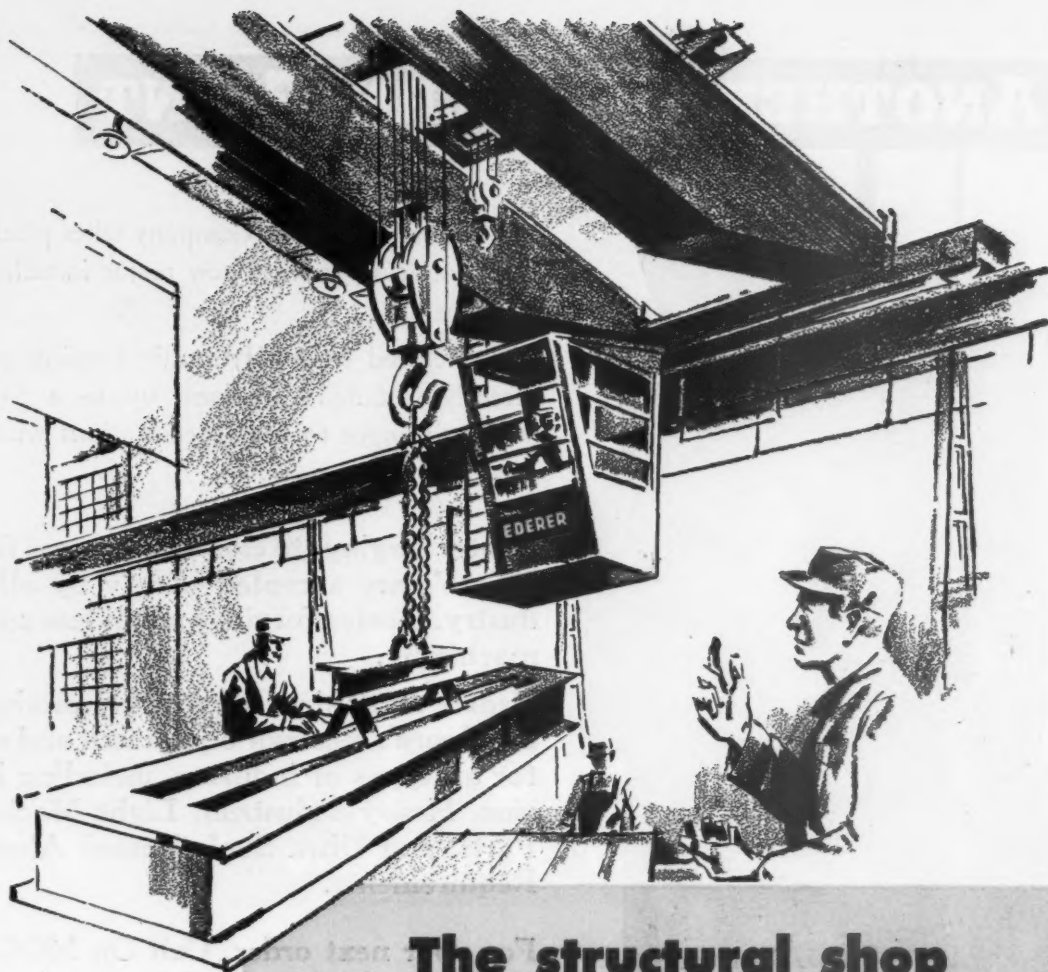
EASIER, FASTER ASSEMBLY undercut high costs when Purolator switched from a two-piece fastener (right) to an RB&W-designed cold-formed fastener (left) for its famous oil filter.

RB&W *serves Western industry*
with the complete quality line



WEST COAST PLANT: 4466 Wirth St., Los Angeles, Calif. Other plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. Additional sales offices: San Francisco, Dallas, Chicago, Detroit, Pittsburgh, Philadelphia. Sales agents: Portland, Seattle. Distributors from coast to coast.

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CRANES

ANOTHER WESTERN GIANT

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FOR NEATER, BETTER FORGINGS,

"One off" or a Carload,
Address all inquiries to
Sales Department M,
Moore Dry Dock Co.

FROM INGOT TO FINISHED PRODUCT IN ONE PLANT

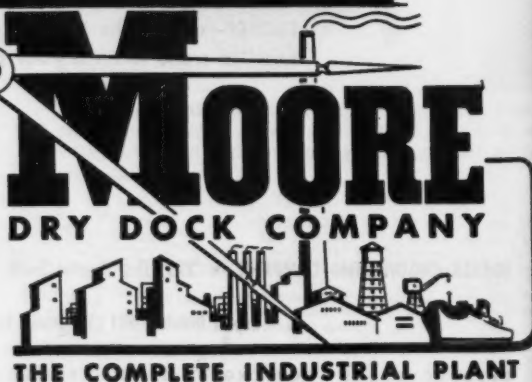
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ANNEALING
HEAT TREATING

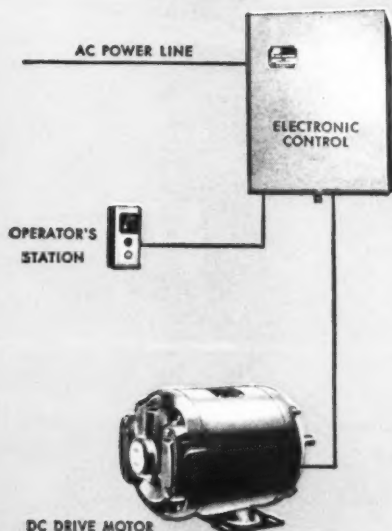
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FT. OF ADELIN ST., OAKLAND 4, CALIF. HI 4-3919



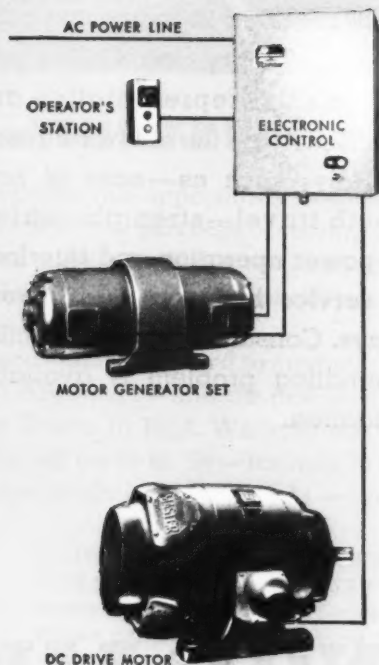


TYPE ET SPEEDDRIVERS are electronically controlled, transistor-type, adjustable speed power drives with a wide range of operating speeds and good speed regulation. They are 1 to 10 HP with basic speeds of 2400, 1750 and 1140 RPM. Drive speeds are adjustable down to one sixth of the basic speed for continuous duty, 50°C., down to one tenth of basic speed for intermittent duty. TYPE ET SPEEDERS. These convert AC power to controlled by a transformer-rectifier set and by tube type electronic circuitry to supply a DC variable speed drive motor. This DC drive motor is of the separately excited type, which inherently has good speed regulation.

STANDARD CHARACTERISTICS are constant torque rating over the full speed range; ... sensitive control from a compact operator's station; ... infinite stop of speed adjustment; ... excellent starting and good speed regulation.

OPTIONAL FEATURES are freighting, reversing, dynamic braking, wide speed range and special duty cycles.

New electronic variable speed drives



TYPE GT SPEEDDRIVERS are electronically controlled, motor-generator type, adjustable speed power drives with a wide range of operating speeds and good speed regulation.

SIZE: 1 to 10 HP with basic speeds of 2400, 1750 and 1140 RPM.

SPEED RANGE: Drive speeds are adjustable down to one sixth of the basic speed for continuous duty, 50°C., down to one tenth of basic speed for intermittent duty.

HOW IT WORKS: These convert AC power to controlled by a transformer-rectifier set and by tube type electronic circuitry to supply a DC variable speed drive motor. This DC drive motor is of the separately excited type, which inherently has good speed regulation.

ADVANTAGES: The Type GT Speeddrivers have the same standard characteristics and optional features as listed above for the Type ET Speeddrivers.

SALES POINTS: The DC drive motor for the Type GT and GT Speeddrivers are available with Motor Line Brakes, Field Drive and Regenerative Braking.

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- ... To Handle Variable Jobs
- ... For Low Maintenance Cost



These are just a few reasons why American MonoRail Cranes are gaining in popularity and are being installed in increasing numbers of plants the country over. Call in your American MonoRail representative and have him tell you all the advantages of MonoRail Cranes such as—ease of handling—smooth travel—strength—safety interlocks—power operation and interlocking carrier service between and beyond the craneways. Consultation in connection with any handling problem is available without obligation.

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SEASON'S GREETINGS



from "THE FRIENDLY HAND OF HYSTER SERVICE"

May we take this opportunity of thanking our customers for the privilege of serving them this past year. We appreciate the confidence they have placed in Hyster® Equipment—and in our services.

We are looking forward to another year with our old customers—and the new who will buy Hyster Trucks in 1954. We trust you will continue to call on us in '54—for help in reducing your materials handling costs—for help in

placing the *right* industrial trucks and attachments on *your job*—for the help that will keep your job "on schedule".



And may we predict that those who will avail themselves of this help from "The Friendly Hand of Hyster Service" will enjoy a happier, more profitable 1954! We are at your service at *any time*! So why not start the new Year right by calling us *now*?



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Filmore 6471

HYSTER COMPANY
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Seattle 9, Wash.
Elliott 2401

HYSTER COMPANY
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HYSTER COMPANY
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San Francisco 24, Calif.
Mission 8-0608

Be Sure to Call HYSTER Before You Buy ANY Lift Truck

The new concept of purchasing

THE MOST POTENT weapons a salesman has at his command are the knowledge and ability—coupled with a sincere desire—to help his customer buy better, it was pointed out in an article in the November issue of *WESTERN INDUSTRY* by H. E. Eastman, purchasing agent of Clary Multiplier Corporation of San Gabriel. He cited several interesting examples of intelligent help from salesmen, but was too modest to say that a purchasing agent needs to have sufficient perspicacity to discern whether the proffered help is intelligent or not.

This story is an example of what John A. Hill, president of Air Reduction Company, Inc., called "the purchasing revolution" at the National Association of Purchasing Agents convention at Los Angeles last May. He listed five basic concepts of modern purchasing, as follows:

1. Purchasing is not a service function but a profit-making activity.
2. Where materials are a large part of the total cost, procurement is best handled as a separate and distinct function, reporting directly to the chief executive of some other top-level operating executive.
3. The real purchasing job starts long before the "specs" or requisitions are written.
4. Purchasing needs and deserves highly trained, competent personnel on a par with any other part of the business.
5. Purchasing should be represented in top operating councils.

A strong, independent, competently-staffed purchasing department does far more than assure a company of good representation in the market, Mr. Hill asserted. It creates a new control point where all company plans and programs are rechecked from a cost-versus-value point of view by men who specialize in cost and value. He pointed out that engineers in the purchasing department had made tremendous contributions, particularly in the field of product design and the purchase of machinery and equipment, in one case being able to save more than \$100,000 in the purchase of a single piece of generating equipment.

Isn't it time, say we, for everyone to discard the word "agent" and replace it with purchasing "manager" or "director," as so many companies have done, or even to coin the new title of "purchasing engineer"?

"Blessed are the Peacemakers"

EAST IS EAST, and West is West, and never the twain shall meet, quoth Rudyard Kipling. You ought to see how the Mountain States Employers Council worked this out in their new building, so that employers and union men don't have to be crowded together in the same reception room. It's quite something. The twain do meet, of course, but in special conference rooms.

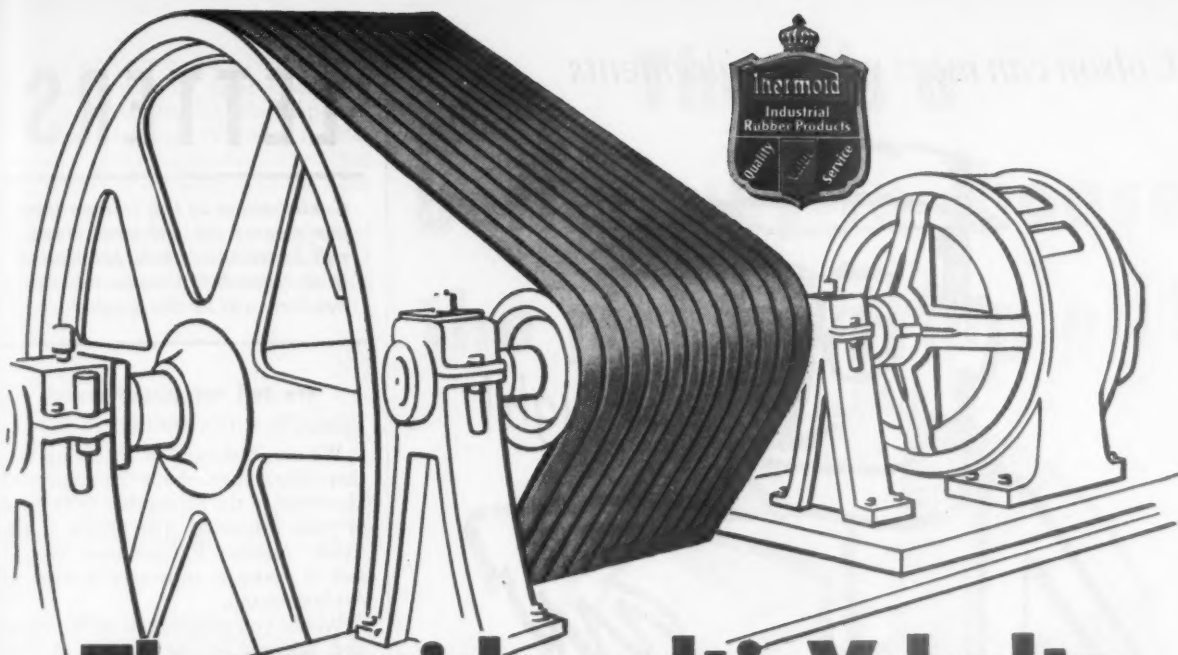
This year

"HOW DID we do this year?" "What are our prospects for next year?" "Where will we be a year from now?"

These are the things that dominate our attention as 1953 draws to a close, and another year looms up ahead.

But does the "year" determine how we stand? What is a year, anyhow? Isn't it a procession of thoughts, and acts resulting from these thoughts, which somehow spread themselves over what we call 12 months? One man may be living right now in 1954, even in 1964, while another is back in 1943, perhaps even 1933.

To each man in an organization, the year is a different thing, signifying achievement or failure, regret or satisfaction, fear or assurance, doubt or hope. He makes his own year; the year does not make him.



Thermoid multi-V belts pre-stretched for non-slip performance

When you use Thermoid *Pre-stretched* Multi-V Belts, you can be sure of maximum power transmission, economical non-slip performance and extra long belt life.

Thermoid Multi-V Belts withstand moisture, abrasion and repeated shock loads.

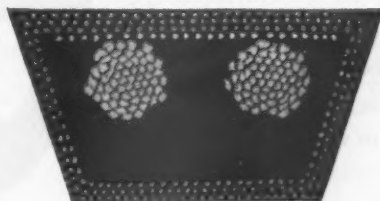
They're built to take it—specially designed to resist internal friction and heat.

Your Thermoid Distributor can help you with power transmission problems, whether you use Multi-V, F.H.P. or Flat Transmission Belts.

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Grommet type construction assures lower permanent stretch, greater flexing ability and shock absorption.



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LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if so requested. Unsigned letters, however, will be disregarded.

We tell 'em about wood

Editor, WESTERN INDUSTRY:

We are interested in obtaining further information about the subject of an article in the September 1953 issue of your magazine. The article is entitled "Another Extract from Wood" and is about a substance known as Arabogalactan.

Would you please send us the name and address of the author of this article.

J. R. MCFARLAND
L. D. McFarland Company,
Sandpoint, Idaho

Far-reaching report

Editor, WESTERN INDUSTRY:

The National Manpower Council is conducting a study into manpower problems related to technical and skilled workers. Obviously, we are interested in apprenticeship activities.

I understand that you included a special section on The North American Apprenticeship Conference in your July 1953 issue. I would appreciate receiving a copy of this section. Thank you.

DALE L. HIESTAND
National Manpower Council, Graduate
School of Business, Columbia University,
New York

More coal approbation

Editor, WESTERN INDUSTRY:

The article in your August issue entitled "Bulk Loading Facilities Comparable to the East" delivers the message in a most illuminating manner. You are to be congratulated on a thoroughly excellent job.

J. J. HOLWERDA
Assistant to the President, Spring Canyon
Coal Company, San Francisco

Management shows interest

Editor, WESTERN INDUSTRY:

... May we express our appreciation for the splendid section on apprenticeship in the July issue of WESTERN INDUSTRY, which I am sure did much to stimulate interest among management

in our Conference [First North American Conference on Apprenticeship], and your excellent article, "Apprenticeship Training Progress Is Reported," in the September issue. That was a very good analysis of the Conference.

In connection with your analysis of the attendance at the Conference, I think you might find the following breakdown of interest:

Labor	293	26%
Management	170	15%
Apprentices	115	10%
Government (conferees)*..	112	10%
Government, service and training†	60	5%
Schools	61	5%
Civic and service organizations	13	1%
Wives and children.....	266	23%
Others, or not identified....	47	4%
	1,137	99%

*Includes 10 speakers at opening ceremony, 3 stenographers, anyone connected with any city, state or federal government (U. S. and Canada).

†Field representatives of this Division and the Bureau of Apprenticeship, U. S. Dept. of Labor, who were present at conference as part of their annual training conference, and not as actual conferees.

Please note that the foregoing breakdown shows a very good proportion of labor to management representation (26% to 15%), inasmuch as the usual ratio at such conferences is labor 3 to 1. We ourselves found these figures interesting and most encouraging.

We think it is highly commendable that your magazine with its large circulation in the Western states among business has devoted space to publicize apprenticeship training. More publicity like this is needed; WESTERN INDUSTRY has indeed set an example. If in the future we can be of any help, please feel free to call on us.

ARCHIE J. MOONEY

Secretary, California Apprenticeship Council, California Joint Planning Committee, San Francisco

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RICHFIELD OIL CORPORATION





Photo courtesy Clark Grave Vault Co.

Use this complete strapping service!

TRAINED Brainard salesmen can help you develop more efficient systems for packaging, palletizing, carloading, bundling, export crating, and warehousing. For example, here's salesman Jack Worrel of Columbus, giving an *on-the-job demonstration* to a customer shipping heavy steel vaults. Properly applied steel strapping holds the corrugated covering securely in place, protecting the product against damage in transit or in storage.

It's a wise idea to add a Brainard salesman to *your* materials handling team. He's factory trained in handling and shipping methods. He's equipped to study your operations, make specific recommendations, and demonstrate proper strapping methods to your personnel.

Send coupon now for an analysis of your handling and shipping operations . . . it can lead to improved efficiency and substantial savings.

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- ☐ Send catalog on Brainard Strapping System
☐ Please arrange strapping system analysis
of our operations.

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Position _____
Company _____
Address _____
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CALENDAR OF MEETINGS

JAN. 7-8—Canners League of California, annual fruit and vegetable sample cutting, Hotel Fairmont, San Francisco. Contact Canners League, 64 Pine St., San Francisco 11.

JAN. 28-30—Colorado Mining Assn., annual meeting, Shirley Savoy Hotel, Denver. Contact Robert S. Palmer, executive vice president, 204 State Office Bldg., Denver.

JAN. 29-30—Industrial Engineering Institute, University of California, Berkeley campus. Contact Bruce G. McCauley, general chairman, Assistant Professor of Mechanical Engineering, U. of C., Berkeley 4, Calif.

JAN. 31-FEB. 3—California & Nevada Mfrs. of Carbonated Beverages, regional meeting, San Francisco. Contact G. Culley, executive secty., 20 S. First St., Alhambra, Calif.

FEB. 1-2—Industrial Engineering Institute, University of California, Los Angeles campus. Contact Bruce G. McCauley, general chairman, Assistant Professor of Mechanical Engineering, U. of C., Berkeley 4, Calif.

FEB. 1-5—National Assn. of Corrosion Engineers, annual short course in corrosion, Washington State College, Pullman, Wash. Contact Dr. M. F. Adams, associate chemist, Division of Industrial Research, WSC.

FEB. 2-5—American Society of Sugar Beet Technologists, eighth general meeting, Shirley Savoy Hotel, Denver. Contact Box 531, Fort Collins, Colo.

FEB. 7-9—Washington Bottlers Assn., state convention, Tacoma, Wash. Contact E. Smith, Seattle, MA 7496.

FEB. 11-12—California Industrial Safety Conference, Palace Hotel, San Francisco. Contact M. Flagg, Educational section, State of California Dept. of Industrial Relations, 965 Mission St., San Francisco 3.

FEB. 15-17—National Welding Supply Association, national convention, San Francisco. Contact Robert C. Fernley, secretary-treasurer, 1900 Arch St., Philadelphia 3, Pa.

FEB. 17-19—Western States Meat Packers Assn., regional meeting, San Francisco. Contact E. F. Forbes, president and general manager, 604 Mission St., S. F.

FEB. 23-28—American Concrete Pipe Association, national convention, San Francisco. Contact Howard Peckworth, managing director, 228 N. LaSalle St., Chicago 1, Ill.

MAR. 2-3—Institute on Industrial Plant Design, Biltmore Hotel, Los Angeles. Contact: Franklyn Cole, Los Angeles Chamber of Commerce.

MAR. 5-6—Western States Power Show, regional, San Francisco. Contact O. Peary, convention chairman, 470 Tenth St., San Francisco.

Short **WEBB** Conveyor increases production

CASE HISTORY

at Precision Sheet Metal Inc.

"WE HAVE GAINED FLOOR SPACE without enlarging our building," says B. B. HAYDEN, Vice Pres., "because our new Webb Conveyor has eliminated stacking of parts and all material handling floor traffic."

ONLY 415 FEET of Webb overhead conveyor handles almost all of the material handling problems at Precision Sheet Metal. Raw materials move into and through the production area, into the paint department, through drying ovens and finally to the shipping room. Now employees devote more time to production and less to material handling.

The whole conveyor system including the power unit is over head and "out of the way." The speed of the conveyor is adjustable to the number and production speed of the workmen.

It is adjustable also, to the drying time required for various finishes.

Have you ever considered how much time and labor is wasted with manual handling? Or how much space is wasted by stacked parts, hand trucks and carts? A conveyor system can answer many manufacturing problems; get the facts today—write or phone.



SEND FOR THESE BOOKLETS

A wide variety of case history reports showing uses of conveyors in all types of industry are available. They are filled with data and ideas for increasing production. Write for these easy to read bulletins today!



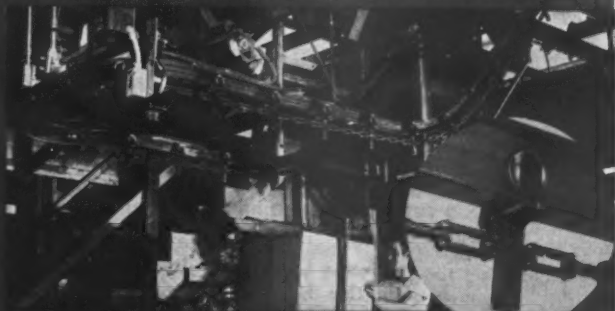
from plant to shipping ...



through painting booth ...



through drying ovens ...



from stockroom to plant

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Typical of the many fine facilities is the bulk loading conveyor which will load and trim bulk cargoes at a rate of better than 500 tons per hour. Used in conjunction with an electric vibrator car shake-out, the loader makes quick work of cargoes such as iron ore, coke, coal, potash, sulphur, salt, gravel and cement.

The hopper bins accommodate two carloads at a time; the wharf handles 80 cars, and approaches provide for 150 additional cars — all making for smooth, continuous operation.

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To operate such Harbor facilities and to serve all industry there is a large reservoir of skilled and technical workers who own homes here.

Thousands of them came here during the war for defense jobs. They liked Long Beach so well they stayed to work in other growing industries. Many others are moving here daily.

Probably no other area offers such a concentration of desirable labor. And they'll be glad to work for you in Long Beach because, although they live here, many of them now work far from home.

Write for free industrial brochure describing the 12 other reasons for locating your plant in the Long Beach area. This invitation is extended by the City of Long Beach and its Board of Harbor Commissioners. Ask for complete details — in confidence, if you like.

CHAMBER OF COMMERCE • DEPARTMENT OF INDUSTRY

200 East Ocean Boulevard, Long Beach 2, California

THIS MONTH'S COVER

KING COTTON grows with the West

ACREAGE OF COTTON in the 11 Western states has grown by leaps and bounds during the last ten years. Much of this new land has been reclaimed from the arid sections which never before have produced any crop. Companion industries have grown right along with the acreage, particularly the cottonseed oil producer.

The San Joaquin Cotton Oil Company, Bakersfield, Calif., has recently doubled its delinting facilities and increased its hulling and separating equipment correspondingly. Its solvent plant, shown on the cover, is capable of handling 425 tons of seed each 24 hours. The solvent applied in this extraction process is hexane, a petroleum fraction commonly used in the solvent extraction of oil-bearing seeds. The solvent plant installation was completed last February and has since been modified greatly to handle increased production more efficiently.

A fire protection sprinkler system capable of delivering 1,800 gal. of water per minute has been installed in the plant.

Cotton oil processors now face the prospect of 700,000 fewer acres of California cotton in 1954, which will doubtless mean reduced production.

ONE of several rows of delinting machines whose saws remove cottonseed lint prior to crushing the seeds. This lint is used for felting and padding, while the seeds go on to be crushed for oil and other products.



FEEDING A PRODUCTION-HUNGRY PLANT WITH A



Feeding raw materials to a production-hungry plant is just one of many uses for the multi-purpose Allis-Chalmers HD-5G Tractor Shovel. It receives bulk materials, then carries them directly to mixing hoppers, conveyors or storage areas as needed. In addition, this powerful crawler excavates for new construction, handles coal, cleans up and loads waste . . . also clears snow and maintains yards and parking areas.

Interchangeable attachments, such as bulldozer blades, special buckets, lift fork, crane hook and trench hoe, add still further to its usefulness.

Tractor Shovels are also available on the three larger sizes of Allis-Chalmers crawler tractors, giving a range of standard buckets from one to four cubic yards — and up to seven cubic yards for light materials.

Let your Allis-Chalmers dealer tell you more about how you can mechanize your materials-handling the efficient tractor shovel way.



Keeps Production Moving—Fast!

The HD-5G feeds bulk materials in exact required amounts for uniform mixture — a full cubic yard at a scoop. In handling light materials, a two cubic yard bucket doubles output. Special fast reverse greatly speeds operation on short runs. This flexible tractor starts boosting production as soon as it's put on the job . . . no waiting for costly installations or changes in plant layout when you mechanize materials handling the Allis-Chalmers tractor-shovel way.



Receives Material at Plant

The HD-5G scoops a heaping load of any material at the unloading trestle, then delivers it directly to mixing hopper, conveyor, or storage area. Truck wheels, idler and support roller bearings are positively sealed against grit and moisture and require lubrication only once every 1,000 hours. This feature alone saves about 30 minutes' greasing time a day.

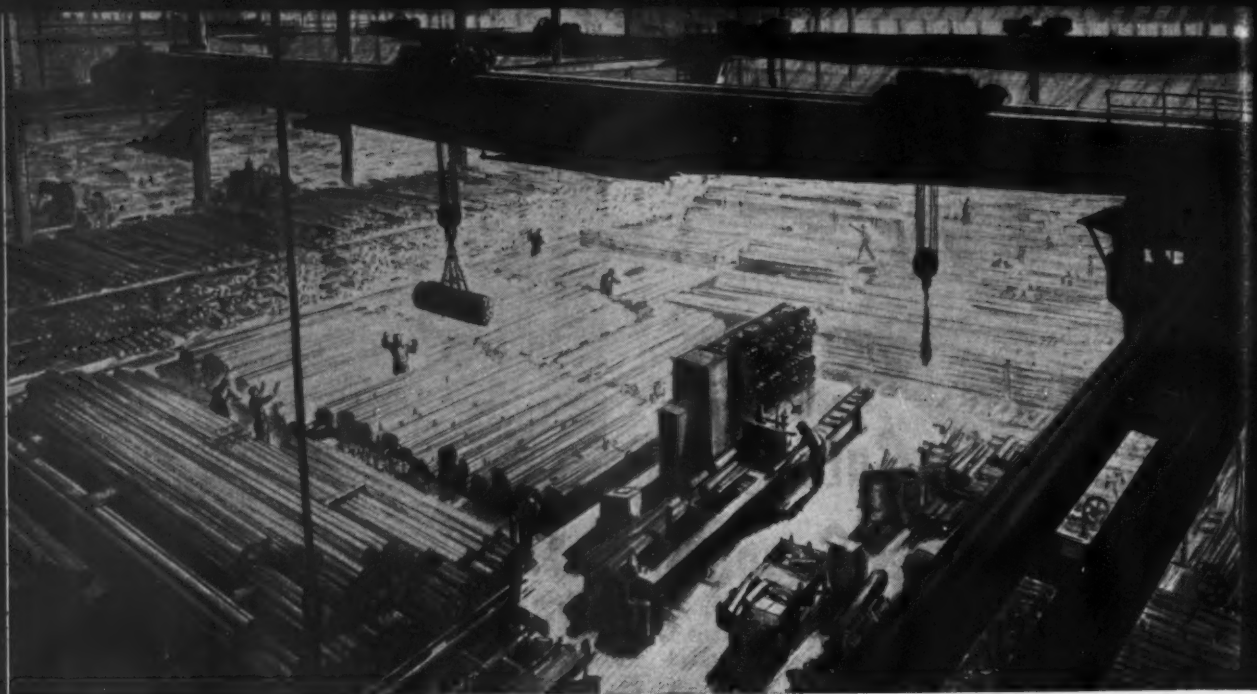


Builds Storage Piles—Anywhere

This fast-working tractor maintains large stockpiles in the open or under a protective shed. Crawler tracks provide traction and flotation to work right up on the pile, enabling it to put many more cubic yards of material into a given area. Tracks also give long life in cullet and similar material as only steel can.

ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U.S.A.



steel stocks... ...again complete!

For years, as you well know, the demand for steel has exceeded the supply. So while we have been able to furnish many thousands of tons from our stocks, all kinds and sizes have not always been available.

Now we are glad to report that our stocks of Ryerson Certified Steels are large and complete. Even though the continuing strong demand still depletes a size here and there, you will find carbon steels, alloys, stainless—everything you need—on hand for quick shipment from your nearby Ryerson plant.

So call us whenever you need steel or have any question regarding what steel to use or how to fabricate it. Our experienced steel men will be ready to help you—and we can promise you prompt, dependable service.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

TUBING—Seamless & welded, mechanical & boiler tubes

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

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SAN FRANCISCO—Plant: 65th & Hollis Sts., Emeryville. Mail: Box 188, Emeryville, California. Phones: Olympic 3-2933, Enterprise 1-0176.

SEATTLE—Plant: 1200 - 4th Ave. Mail: Box 3268, Seattle 14. Phone: Seneca 2300.

SPOKANE—Plant: North 207 Freya St. Mail: Box 2158, Spokane 10. Phone: Keystone 9311.

DECEMBER 1953

MASS PRODUCTION METHODS for job shop lots . . .

*. . . raise efficiency while maintaining
high quality*

APPPLICATION of mass production principles to job lot quantities while maintaining highest standards of quality has been the problem of Berkeley Scientific Division of Beckman Instruments Inc., Richmond, Calif.

Emphasis on research and development of new and advanced means of electronic instrumentation has resulted in the need to produce a great variety of equipment in relatively small lots with maximum efficiency and minimum cost.

Smooth flow achieved

Smooth flow under these circumstances, as well as close control of inventory, is achieved through close coordination between Sales and Production. A Production-Sales-Inventory Forecast is prepared monthly by the Sales department and extended for 120 days. Each month the actual results of the previous month's plans are posted to the master records and the forecast is extended another 30 days. Any adjustments needed are made at that time in the interim schedule.

Production extends this forecast into man-hours per week, month and quarter by departments. This extension is made either by actual or estimated standards. This extended plan is then balanced against sales needs to assure a smooth flow of production and customer satisfaction, as well as a constant level of employment without fluctuations. (Berkeley has never had a layoff of any kind.)

By **THOMAS ALLINSON**

Plant Manager
Berkeley Scientific Division
Beckman Instruments Inc.,
Richmond, Calif.

In the event that variation between scheduled hours and available hours is of consequence, the situation is reviewed to determine whether something can be rescheduled to smooth out the load or whether additional personnel are needed. In the event of additions, the needs are projected longer term than normal to provide stability.

If a further breakdown of the load by operations or equipment is necessary, the steps are taken.

Production job orders are set up

MANAGEMENT STAFF of Berkeley Scientific Div., Beckman Instruments. (Left to right). Standing: Tom Allinson, plant manager; A. Stearns, marketing manager. Seated: A. Libby, comptroller; J. Gordon, chief engineer; and G. A. Bruns, general manager.



based on the projected schedule, and material is assigned to or ordered for each specific job and is scheduled upon the completion of fabrication.

Shop lead times (processing time) have been established for all jobs to facilitate ordering and scheduling and to enable purchased material to arrive as near the time of use as possible. Whenever a job is assigned, all items of material peculiar to that instrument are handled separately.

Items which could affect the total value of inventory most severely are closely controlled. All personnel concerned are alerted to the items of high value or peculiar usage by the traveling requisitions used for ordering all items of expense and inventory. These are red in color to differentiate special items from all other purchases.

The Purchasing department gives these red requisitioned items special attention, in that constant attempts are made to reduce delivery time, thus reducing inventory. Efforts are continually made to obtain competitive bids to assure the best costs.

New products

A pilot run is always made on new equipment to prove out the design and production techniques required. The period between the release of engineering design and the completion of the pilot run has been shortened to 45 to 60 days by the simple expedient of a committee meeting of development engineer, production engineer, production control and purchasing. This is

Production-Sales-Inventory sample forecast

Model	December			January			February
	Scheduled production	Estimated sales	Finished inventory position	Scheduled production	Estimated sales	Finished inventory position	etc.
1009	100	93	+7	100	110	-3	

done upon completion of the original engineering prototype.

The group determines the parts which are critical from the standpoint of quality and delivery time. A calculated risk is then taken on these items by ordering sufficient quantities for the first one or two lots. This results in some scrappage, but reduces by many weeks the period otherwise required to develop and put complex new instruments into production.

Bills of materials used

A two-stage bill of material simplifies production control, stores and assembly. All equipment is released to production on master bills of materials, showing the total usage of each component per instrument. These are used for a single entry assigning material to a job on the Kardex records and also by the Accounting department in determining the standard cost of materials required. Each job is also issued on subassembly bills of material. These are used for "pulling" parts from the stock bins and issuing them to the assembly operations in a segregated manner, thus allowing subassemblies to be processed efficiently without any extra sorting. These bills of material then return to production control for posting actual issuance of materials and later are forwarded to the Accounting department for use in crediting stores and debiting work in process.

Since small lots are the rule and the equipment varies greatly in size, con-

ventional assembly line conveyor belts are not practical. The principle, however, is applied in two ways. In Method A, the operators are stationary and the work is passed from one to another until all operations are complete at the end of the line. Portable storage bins are located between the operators for in-process units.

Production control categories

Several systems of production control are used in ordering materials for jobs. The various items are broken down into categories and handled as indicated.

Class	Description	Method of handling
A	Items of high value and multi-usage (used on more than one piece of equipment).	Ordered and scheduled by department head. Inventory status reviewed monthly.
B	Items used on one piece of equipment only.	Ordered and scheduled based on each job order. No minimum set. No automatic ordering.
C	Items of low value and multi-usage.	Minimums established based on previous three months' usage—the minimum is re-established by order clerk each time an order is placed.

The assembly tables are versatile and operator lines of any length desired can be easily arranged. Method B reverses the procedure in that the units are stationary and the operators use sliding trays to move their tools and parts down the assembly line. All table centerpieces, stack bins, etc., are removable and can be built up for any desired operation. The first operation performed by each operator is closely

checked and approved by the group leader to assure proper quality and compliance with drawings.

The inspection crew of skilled technicians and inspectors operate in accordance with approved Joint Army Navy quality control procedures. In-process inspectors move through the assembly and fabrication operations, inspecting critical items. Even some of the final inspection on the instruments takes place in assembly as the instruments are completed. This process is known as debugging and eliminates the necessity of back-and-forth material handling.

Inspectors have a unique way of rapidly inspecting wiring and terminal boards. They use plastic over-lays marked to indicate the correct position

of each wire and component. A quick visual check determines compliance with the over-lay. Fabrication inspectors use shadow boxes to accomplish the same thing.

When the completed instruments move to Inspection, each piece of equipment is microscopically checked, physically and electrically, for adherence to the strict Berkeley standards. Due to the precision required and the high standards of performance, much of the test equipment has been designed and built in the plant, an example of the close cooperation between departments since Engineering and Inspection jointly develop and assemble this special type of equipment.

In Inspection mass production techniques are used wherever applicable, the test procedures being broken down, with the more routine checks performed by less skilled inspectors and the final testing and approval done by the most skilled technicians. All test gear is on wheels and is moved from one piece of equipment to another. Each instrument is aged and thoroughly rechecked before being released to the Shipping department en route to the customer.

Manpower load schedule Fabrication (assembly or inspection)

Model	December		January		February	
	Quantity	No. hours	Quantity	No. hours	Quantity	No. hours
1009	100	2,000	50	1,000	0	—
1010	10	30	10	30	30	90
1019	20	100	0	—	20	100
1028	0	—	50	1,000	50	1,000
1037	0	—	10	20	20	40
		etc.		etc.		etc.
Total hours needed		22,130		22,050		21,230
No. hours available based on No. men and days in month		22,100		22,400		20,090



Stores layout

All bills of material list components in categorical sequence; i.e., (1) resistors, (2) transformers, (3) tubes, etc. Categories may be readily analyzed on Kardex and in stores for inventory.

Categorizing allows stores personnel to put up orders with a minimum of backtracking and crisscrossing. Storage racks can be tailored for the category of a part to be stored since physical characteristics of parts in each category are similar.

Headache holders

Wires for cable jobs are cut to length and inserted in special headache racks (so named because they eliminate headaches) in the sequence used. Work is done by wire preparation department, and job delivered to cable department for assembly.



Layout planning is thorough

Plant engineer plots flow sequence, equipment location and office arrangements on a precise scale model. Completed mock-up is shown to plant manager for review. When final plans are approved, all costly experimenting has been done.



Single operator production

Specially designed and built process racks permit mass techniques for smallest runs. The operator performs operation 1 on each instrument, placing unit in rack.

When all instruments are completed, operator feeds equipment from rack through operation 2 and into a rack on the other side. Results are similar to eight or ten operators on a production line.



Machines on wheels

To produce varied products in small lots on a mass basis, it is essential that the well-equipped machine shop not be tied down. Fabrication foreman may have drill presses, spot welders, grinders or shears here today and there tomorrow. Every type of equipment must be able to shift into its proper spot on a variety of production operations.



(LOWER LEFT) The completed lot is then delivered to secondary spray booth in the Assembly department for final moisture and fungus proofing. No backtracking through the regular paint shop needed for this special job.





GADSBY'S No. 1 turbine. Its throttle steam is 950 deg. F. at 1,250 psig. Maximum rated steam flow is 561,000 lb. per hour.

INSULATION can make your fuel rate *shrink*

**Here's how a steam power plant
cut costs and upped efficiency**

By WILLIAM JENNINGS, Assistant Chief Engineer,
Utah Power & Light Co., Salt Lake City

INSULATION is one of the important factors that have contributed to the increased efficiency of Utah Power and Light Co.'s Gadsby plant in Salt Lake City, Utah.

Each new plant added to the company's equipment uses less fuel per

kw-hr generated, and over a period of 40 years fuel requirements have been whittled down from 2.3 to .88 lb. of coal, or equivalent, per kw-hr generated.

Several features such as higher temperatures and pressures, improved fir-

ing methods and the use of a reheat cycle, have contributed to this efficiency. In addition, insulation in the new plant was fully engineered and carefully applied, which undoubtedly accounts for a part of the improvement. The fact that piping at 600 deg. F. in the old Jordan plant was insulated with 2½-in. thick 85% magnesia while the Gadsby plant piping at the same temperature was insulated with a 3½-in. thickness is an indication of how increased insulation is helping to achieve higher efficiency.

TABLE I
40-Year Efficiency Record
Utah Power & Light Co.

Amount of fuel required to generate one kw-hr of electricity. Net output expressed in pounds of coal or equivalent.

Year	Plant	Lb. of coal per kw-hr
1912	Jordan Nos. 1 and 2.....	2.3
1929	Jordan No. 3.....	1.5
1936	Hale No. 1.....	1.25
1950	Hale No. 2.....	1.0
1951	Gadsby No. 1.....	0.95
1952	Gadsby No. 2.....	0.88

Throughout the Gadsby plant, equipment and piping at temperatures above 100 deg. F. were insulated with appropriate thicknesses of 85% magnesia or a combination of diatomaceous silica and magnesia. Surfaces were cleaned and equipment and piping pressure-tested before the insulation was applied.

Thickness varies

Blocks of magnesia were wired to equipment and finished with two 1/4-in. layers of asbestos insulating and asbestos hard-finish cement. Indoors, a pasted jacket of 8-oz. canvas completed the application; outdoors, a jacket of 45-lb. asphalt saturated asbestos roofing felt was applied. The thickness of the magnesia blocks depended on the operating temperature of the equipment, and ranged from

INDUCED DRAFT FAN, handling 330 deg. F. exhaust gases of Gadsby No. 1 boiler was insulated with 85% magnesia and suitably weatherproofed. In the background is the 13-story boiler.

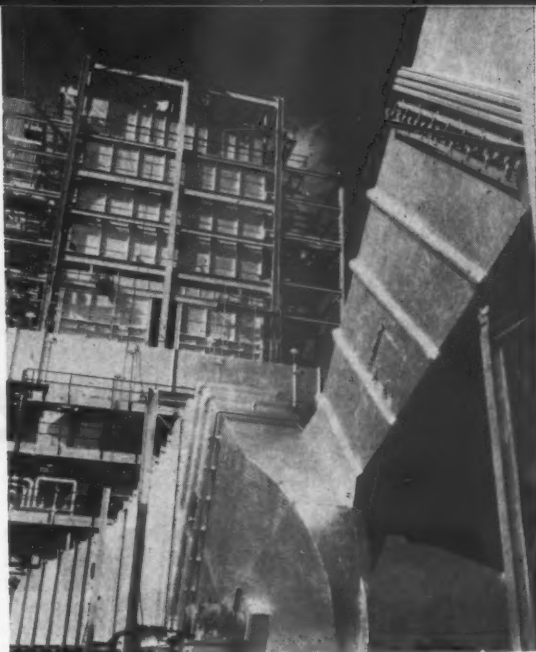


TABLE II
Insulation Thicknesses—Equipment
Gadsby Plant

Equipment	Temperature range, deg. F.	85% Magnesia, inches
Secondary fuel oil heaters, closed feedwater heaters Nos. 4, 5, and 6. Secondary chemical injection tanks, fuel oil pumps, secondary boiler feed pump.....	351—500	2 1/2
Evaporator preheater, fuel oil tanks, recirculating heater, primary fuel oil heaters, closed feedwater heaters Nos. 2 and 3, evaporators, evaporator condenser, precipitator, induced draft fan and flues.....	251—350	2
Closed feedwater heater No. 1, deaerator heater, closed drip tank, oakite tank, sealing water return tank, flash tanks, primary boiler feed pump, oil skimmer and flash tank, hot water heater.....	151—250	1 1/2

1 1/2 in. to 2 1/2 in. as shown in Table 2.

Piping was insulated with sectional or segmental insulation. Total thickness of insulation—85% magnesia alone or in combination with diatomaceous silica—depended on pipe size and temperature; it varied from nominal 1-in. thickness for a 1/2-in. pipe at 100 deg. F., to 5 1/2 in. insulation for a 14-in. pipe at 1,000 deg. F.

The turbines were insulated with up to 5 1/2 in. thicknesses of combination insulation. On turbine sections which required occasional dismantling, asbestos insulating blankets of equivalent thickness were applied, so as to be readily removable and replaceable. The turbine insulation was finished with a steel casing.

The two generating units now in operation at the Gadsby station have a combined capacity of 141,000 kw., and another 100,000 kw. are to be provided by unit No. 3 when it goes into operation. Superheated steam (950 deg. F., 1,250 psig.) is generated for the turbine of unit No. 1 by a Riley

non-reheat boiler with a continuous rated capacity of 620,000 lb./hr. A Riley reheat boiler, with a capacity of 575,000 lb./hr. supplies the No. 2 turbine with 1,000 deg. F., 1,450 psig. steam, reheated to 1,000 deg. F.

A residual pitch by-product, piped to the plant from an oil refinery near

Salt Lake City, is presently being fired in the No. 1 unit. Unit No. 2 boiler is equipped to fire pulverized coal or pitch, and natural gas firing equipment is to be installed during the latter part of 1953.

Month's fuel supply

Three 21,000-barrel tanks, located above ground out-of-doors, hold enough fuel for about 30 days of normal operation of the No. 1 unit. Because the highly viscous pitch would completely solidify at ambient air temperatures, provisions had to be made to maintain its temperature well above the melting point. This is accomplished by constantly recirculating this fuel between the storage tanks and the pump house, where it is heated sufficiently to maintain an average temperature of 200 F. All transfer piping and the three storage tanks are insulated with 85% magnesia in order to keep the pitch hot and fluid, and thus to prevent clogging of lines, pumps and burner nozzles.

THE GADSBY PLANT contains miles of piping, at temperatures between 100 and 1,000 deg. F., insulated with 85% magnesia alone or in combination with diatomaceous silica.





BRANCH PLANT ECONOMY ... THE WEST'S DOOM?

*"Educated money" can be the key to developing
national industries in the West*

THE CHALLENGE

Has the West no better destiny than to become just a branch plant economy?

Are we only the tail of an Eastern kite?

Must the growth of each industry in the West stand still until an Eastern concern decides that the Western market is big enough to be served by a branch plant out here?

While this article deals only with the chemical field, the situation is comparable to most other lines of industrial activity in the West also.

IF THE TECHNICAL and marketing men would raise their sights above the local level and look to national markets, and if there was a source of "educated money" in the West, the prospects for a Western

chemical industry would be bright, according to Joseph J. Jacobs of the Jacobs Engineering Company of Los Angeles.

Many chemical plants could be justified in the West years before the local market could theoretically absorb the output of a minimum sized plant, in his opinion, but it will never be done by the companies who already have plants in Texas or the East.

Hesitant venture capital

Lack of "educated money" is a big drawback, he feels, because venture capital, of which there is plenty in the West, is unfamiliar with the risks and possibilities in this field. Decisions to go ahead depend on accurate evaluation of the risks, which is only possible with familiarity and competent appraisal.

The result is that we must wait for the "educated money" in the East to establish a Western chemical industry, which means in most cases the large chemical companies.

"Consequently, we are in danger of becoming a branch plant area," he told the Chemical Marketing Research Group in Los Angeles recently. "Because of this, we have to wait until

the local market will support such a plant before we get it.

"Naturally these eastern companies wait until the last possible moment, because they are reluctant to go into competition with themselves, which is what putting up a Western plant amounts to if they already have a large plant in the East."

Provincialism is a second big drawback indicated by Mr. Jacobs.

"Because the majority of the people who are in a position to consider a chemical plant in this area already have plants in other areas," he said, "they generally consider the West as a separate entity, almost as if there were tariff barriers between here and the rest of the country."

"All other things being equal, I submit that it is perfectly possible for a Western chemical industry to operate profitably on a national basis. One manifestation of this provincialism is the common misconception that freight rates from East to West are lower than from West to East. This is not true. If the commodity movement can be established, the chances are the freight rates will be exactly the same for the same haul.

"We did a study once which indi-

cated that a minimum sized plant for a certain chemical could be erected in the West, ship 40% of its production to the East coast and still be competitive with a Texas plant shipping virtually all of its production outside its own area. Of course, this will not be true in every case, and it may be that raw material advantages are more important than those other factors, but the point is, the consideration of a Western plant should be first appraised from a national view."

Some Western firms succeed

There are some excellent Western chemical companies who are doing a fine job, asserted Mr. Jacobs, but they need some augmentation, and although the petroleum industry should be a logical spearhead of such a move, the oil people are not yet chemically educated, in his opinion. "After all, who has spearheaded the great petrochemical boom?—the chemical companies, like Carbide & Carbon Chemicals Company and others, not the oil companies. What companies are making the bulk of the alcohol, ammonia, vinyl chloride, acrylonitrile, etc., from petroleum raw materials? The Shell Chemical Company, Oronite, and the recent formation of Brea Chemicals are certainly a wonderful step in the right direction, which may reverse the past history.

Possible solution

"A characteristic of the petroleum company approach is that the new venture must involve very substantial investments and substantial tonnages of products. This is understandable in view of their background and experience. What is needed really is a source of venture capital (educated, of course) to cover the range of investment of \$250,000 to say \$3,000,000. We have several small companies who could handle the smaller investments very well, and the larger ones could probably best be handled by the larger petroleum or chemical companies."

One solution suggested by Mr. Jacobs is the organization of a Western group similar to the American Research and Development Corporation, formed by several wealthy Boston businessmen with a substantial amount of risk capital and with the avowed purpose of investing in new chemical ventures. These people brought into their group several topnotch technical men who could keep their money "educated," and the corporation has been outstandingly successful.

"Such a group should limit itself to the chemical field, so they can concentrate their know-how," Mr. Jacobs told the Chemical Market Research

Group. "Right after the war, a similar group was organized in San Francisco, but it had no clearly defined aims. Being run by financial men only, it made investments in such varying things as four per cent second mortgages and coin machine hot dog vendors. Because they did not become specialists, they got caught in some pretty poor investments and finally disbanded with a loss.

"The group I am proposing should concentrate in the chemical field and should be heavily interspersed with good technical men who can evaluate new ventures properly. Extensive use of feasibility studies as outlined here would be mandatory.

Good example

"I have a very good example of what I mean. Almost two years ago, a group of men with the know-how decided that a lead tetraethyl plant would be practical on the West Coast. They have spent much time and money doing design studies, arranging for patent licensing, studying markets, etc. They have even obtained a certificate of necessity. However, I understand the only thing holding them up now is proper financing.

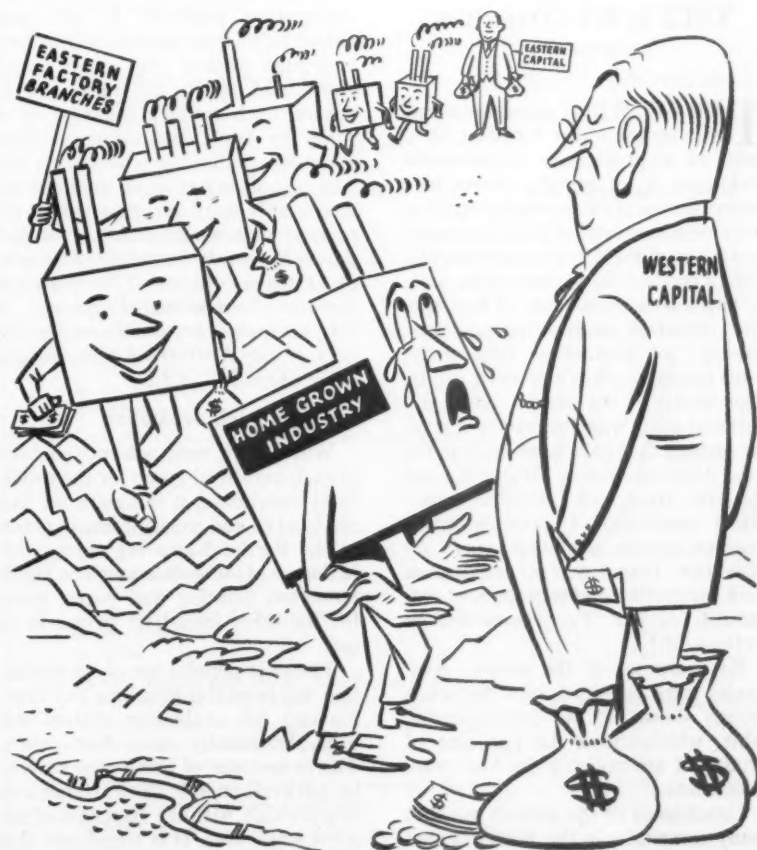
"I have no way of knowing if this plant has any merit or whether it is economically sound, but it would be a perfect type of thing to be considered by a group such as I propose. There are undoubtedly many such ventures which need only the sympathetic ear of 'educated money' to get them started."

WHAT'S THE ANSWER?

At the rate that Western firms, both old established houses and younger concerns, are selling out to Eastern companies, Mr. Jacobs' challenge to Western capital is pertinent.

Can Western capital be educated to see that it needs to strengthen independent Western manufacturers?

Or is it a case of Western manufacturers not knowing how to sell themselves to Western capital?



COMPARE YOUR METHODS

with this survey—

Study of industrial engineering practices in the Portland area

By

ARTHUR L. ROBERTS

Assistant Professor of Industrial Engineering
Oregon State College
Corvallis

AND

LYLE E. WEATHERBEE

Graduate Assistant

THE GROWING use of industrial engineering in the Portland, Ore., area as a progressive management technique is realistically shown in a recent survey of firms employing 50 or more people, a total of 25,832 persons, or 47% of the 1950 estimated population of production workers in the area.

This survey was made of four specific industrial engineering practices, namely: job evaluation, time study, wage incentive plans and merit rating. The results of the survey, plus comparisons made with the results of similar surveys that have been made in the Los Angeles, Texas, Midwest, and Eastern areas, are included where direct comparison is possible. [Still another survey was that made by WESTERN INDUSTRY, in cooperation with universities and management consultants in the West, published in 1950.—Ed.]

For purposes of the survey, companies were classified into the seven groups shown in the accompanying table, which shows the per cent of firms that are utilizing the four practices studied.

Conclusions of the authors are that many companies in the Portland area are not making full use of sound

industrial engineering practices that have proven their worth many times in other areas. The lumber and wood products companies seem most reluctant to try these cost-saving tools.

Perhaps one method of stimulating more interest in the use of industrial engineering practices in this area would be to train additional qualified personnel so that they could understand and apply the various techniques. Such training could be sponsored by trade associations, college extension, individual companies, etc. The cost of such training would be immeasurably small in comparison to the savings that would result. [Another possibility might be the establishment of a Portland chapter of the American Society of Industrial Engineers. In this, no doubt, they could count on the help of the Northern California and other chapters.—Ed.]

Job evaluation

While there were not enough firms in each industrial group for the results to be conclusive, it is significant that the lumber and wood products plants in the Portland area lag appreciably in the use of job evaluation. The highly unionized printing and paper group led the other industrial groups in its use.

The most popular use of job evaluation was in establishing base pay rates. No one job evaluation system was used significantly more than others. The percentage of employees covered by job evaluation in the Portland area is quite high, with the exception of salaried employees. It is significant that the majority of job evaluation plans

Utilization of industrial engineering practices

Industrial groups	% of companies surveyed			
	Job evaluation	Time study	Wage incentives	Merit rating
Clothing and textiles.....	43	57	86	57
Food and food processing.....	44	33	33	44
Metal and metal products.....	25	17	27	33
Lumber and wood products.....	18	36	18	9
Machinery and tool products.....	50	70	10	30
Printing and paper products.....	60	20	20	40
Special and miscellaneous prod....	38	40	62	38
All industries	37	40	36	34

were installed during the period from 1941-1950.

Some companies used staff employees working with a consultant, which is generally considered to be good practice by insuring familiarity with the workings of the plan. Most job evaluation plans were introduced by talks with the foremen and direct explanation to the workers. Other means of introduction that were mentioned were through the union and union agreement, and through joint labor-management committees.

Direct union participation in the operation of a job evaluation plan had no significant difference among the various industrial groups. The majority of the companies reported no difficulties with their job evaluation plan.

The job evaluation practices used in the Portland area can be compared to a limited extent with those used in Texas as a result of a survey made by the Texas Engineering Experiment Station in 1948. The factors where comparison is possible are as follows:

1. Job evaluation is used by approximately the same percentage of companies in both Portland and Texas.

2. The "point system"* of job evaluation was reported to be used by 59% of the Texas firms, which is nearly double the usage of that system in the Portland area. The "ranking or job rating"† method was used by only 16% of Texas firms compared to 35% in Portland.

3. Texas firms were found to have relied more heavily on consulting firms and staff engineers for the development and installation of their plans.

4. Texas firms were found to have

less union participation in their job evaluation plans. Fifty-three per cent of the Texas companies reported having no union at all.

5. The percentage of companies reporting "no difficulties" was the same for both areas.

Time study

See page 38 for time study table

Many companies reported using more than one method of making time studies. Use of the stop watch was predominant, while the relatively new methods-time measurement method was second.

Over a long period, elemental-time data and formulas are considered to be more consistent and less costly than continual use of the stop watch, yet less than a quarter of the companies are utilizing this method.

A few firms were using time study prior to 1930 but the greatest increase in its use, as with job evaluation, came during the war and post-war years when the value of such studies was made more apparent.

Contrary to the best practices, 60% of the firms did not *always* take the trouble to simplify and standardize jobs before making time studies.

Selecting an average operator was the most popular choice of system for rating skill, effort and speed.

It is possible to compare, to a limited extent, the time study practices used in the Portland area with those used in Texas, Los Angeles, the East and Midwest areas. Comparisons are as follows:

1. The use of time study was reported by the same percentage (37%) of Portland area firms as is used in Texas. A larger portion of the Texas firms use their time studies for incentive purposes, however, than do the Portland companies, where the largest use is made for estimating purposes.

**The characteristics of every job are given point values, and each job has a total number of points which are scaled out to get the grades. The money value is then assigned to each grade.—Ed.*

†Certain key jobs are selected and put in order of rank, after which all other jobs are fitted in between.—Ed.

‡This is a variation of "effort rating." The expected level of performance is called 100%, and actual time is adjusted by the percentage.—Ed.

¶This is also called the "leveling" method, and is used to determine the pace of work. Since 1940 it has been largely replaced by "press grade" or "effort rating."—Ed.

2. Methods of rating. Portland area firms rely heavily on the less scientific method of selecting an "average operator," while the 100%[‡] plan is used by over half the companies in the Los Angeles area. Seventy-three per cent of the firms in the East and Midwest areas are reported to use the 100% plan. All other areas reported the use of the Westinghouse[¶] method to some extent.

3. Union participation in time study. At the time that the Texas survey was made, 34% of the companies there reported "no union" and

only 6% reported any participation by the unions in time study.

Wage incentives

Clothing and textile firms in the Portland area held the lead in use of wage incentives. The machine and tool product concerns that utilized time study to the largest extent drop to last place in utilizing those studies for wage incentive purposes.

Of significance is the wide range of both the average and maximum incentive earnings.

Some plans were reported to have

Job evaluation practices

1. Job evaluation used for:	% of companies using plan
a. Establishing base pay rates.....	65
b. Settling grievances.....	17
c. Other.....	35
Note: Some companies use job evaluation for more than one purpose so that the total percentage is greater than 100%.	
2. What system of job evaluation is used?	% of companies using plan
a. Point system.....	30
b. Factor comparison.....	22
c. Ranking or job rating.....	35
d. Other.....	13
3. Percentage of employees covered:	Average % coverage
a. Direct labor employees.....	95
b. Indirect labor.....	81
c. Salaried employees.....	66
4. Is your plan in writing?	% of companies using plan
a. Yes.....	70
b. No.....	30
5. When was your system installed?	% of companies using plan
a. Before 1930.....	0
b. 1931—1940.....	35
c. 1941—1950.....	56
d. 1951—.....	9
6. Who installed your job evaluation plan?	% of companies using plan
a. Consultant.....	17
b. Staff industrial engineer.....	17
c. Staff employee.....	56
d. Other.....	26
7. How did you introduce your plan?	% of companies using plan
a. Talks to foremen.....	56
b. Talks with employees.....	48
c. Articles in company publication.....	13
d. Do not know.....	9
e. Other.....	17
8. Does the union, if any, participate in the operation of your plan?	% of companies using plan
a. Yes.....	39
b. No.....	61
9. What difficulties, if any, have arisen as a result of your plan?	% of companies using plan
a. Results of evaluating specific jobs.....	22
b. Difficulty in explaining to employees.....	17
c. Job description disagreements.....	9
d. No difficulties.....	52
e. Other.....	26
10. In what way or ways do you feel that your company has benefited most by job evaluation?	% of companies using plan
a. Ability to set more equitable wages.....	70
b. Better understanding of jobs.....	48
c. Indicated definite lines of promotion.....	17
d. Clarified lines of authority and responsibility.....	30
e. Simplified wage rate negotiations.....	35
f. Other.....	17

Time study

1. What method or methods do you use in making time studies?	% of companies using plan
a. Stopwatch exclusively	44
b. Elemental-time data and formulas	24
c. Methods-time measurement	28
d. Other	16
2. For what purpose are time studies made?	% of companies using plan
a. Improve efficiency of operations	64
b. Establish standards for incentives	40
c. Cost estimating purposes	72
d. Other	20
3. When did you first begin using time study?	% of companies using plan
a. Before 1930	16
b. 1931-1940	20
c. 1941-1950	48
d. 1951-	8
4. Do you make an effort to simplify and standardize a job before making time studies and setting standards?	% of companies using plan
a. Never	0
b. Frequently	60
c. Always	40
5. What system do you use for rating operator's skill, effort and speed?	% of companies using plan
a. 60-point hour (standard minute)	26
b. Westinghouse method	0
c. 100% plan (where 100% is normal)	16
d. Select average operator	32
e. None	14
f. Other	12
6. What is your employees' reaction toward your time study program?	% of companies using plan
a. They understand and favor	29
b. Neutral reaction	58
c. They understand but do not favor	13
7. Does the union, if any, have representatives trained in time study?	% of companies using plan
a. Yes	10
b. No	67
c. Don't know	18
d. No union	5
8. What means do you use to check the rating ability of your time study men?	% of companies using plan
a. Motion pictures	8
b. Simultaneous time studies	28
c. None	40
d. Other	32

been installed by the home office and merely operated at the local plant.

Several firms again reported using a combination of methods. It is felt by the writers that the high reliance on past performance records is a questionable means of establishing standards.

Some companies reported making changes for more than one reason. One company reported never changing a standard once it was set. Companies that reported changing standards when workers' earnings are too high should investigate more accurate means of setting their standards, since making changes merely because the operators earn too much destroys confidence and may cause the workers to place an artificial ceiling on their production.

Decreased unit cost and increased production was reported by over half the firms along with increased worker

income as a beneficial result of the wage incentive installations. This result substantiates the fact that both labor and management can benefit from sound incentive plans.

Wage incentive practices in the Portland area can be compared with all other areas previously mentioned in the following phases:

1. Type of plan used. Portland firms are about equally divided between using straight piecework, the 100% premium plan, and group bonus plans, whereas the 100% premium plan is predominantly used in the Los Angeles area. Nearly a quarter of the Los Angeles firms indicated the use of split premium plans. In the East and Midwest, the use of group bonus plans is nearly non-existent, compared with 27% of Portland firms using them.

2. Method of establishing standards

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Model #922—Schaible Faucet Assembly with Hydramold Spout. To date more than 1,000,000 Hydramold Spouts have been produced, and not one single failure reported from the field.

Close-up of Schaible Hydramold Machine (Patents Pending): Operation of this machine requires no special skill of the operator. One or any number of workpieces respond to accuracies of a thousandth part of an inch. Wall thickness of spout is uniform, non-porous, without inclusions, seams or joints.

A brass that does not have to be "tailored" to a job, but is made with accuracy in normal mill procedures, meets the unusual material requirements that the Schaible Company has in its remarkable spout fluid forming process called Hydramold.

The Schaible Company, Cincinnati, Ohio, is one of the larger manufacturers of strainers, valves and faucets, who have been more progressive in product design and methods of manufacture. Schaible requirements are exacting as to product quality control. This is especially true of sources of material, and when the company developed, designed and built its four new Hydramold machines to manufacture modern spouts from tubular material, the specifications became most rigid.

This was where the Revere Technical Advisory Staff entered the picture. Revere technical men studied the Hydramold process developed by Schaible engineers, and the unusual forming requirements, thereby helping establish the exacting specifications so that the mill and manufacturer developed mutual material control and process information.

The Schaible Company has made more than one million spouts by this new method without a single field performance failure—better spouts, states Schaible, produced by more economical means than conventional casting methods.

Today, there may be more costly spouts, but according to Schaible "There is no better spout than the Schaible Hydramold formed spout."

This case study is another example of the value of close cooperation between Revere and an exacting customer. The more we know about what you make, and how you make it, the better we can serve you. See the nearest Sales Office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.
Sales Offices in Principal Cities, Distributors Everywhere.

LOS ANGELES: 6900 East Slauson Ave. Underhill 0-3331
SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282
SEATTLE: 1331 Third Ave. Main 1401

Wage incentives

1. Which incentive plan or plans do you use?	% of companies using plan
a. Straight piecework	32
b. Standard hour or 100% plan	32
c. Split premium plan	5
d. Group bonus based on overall average	27
e. Other	23
2. What are the maximum and average incentive earnings in per cent above base pay?	
a. Average	18%, range from 2 to 50%
b. Maximum	32%, range from 5 to 100%
3. Who installed your incentive plan?	% of companies using plan
a. Staff industrial engineer	27
b. Consultant	14
c. Don't know	5
d. Other	54
4. How do you establish standards or rates as a basis for incentives?	% of companies using plan
a. Stop watch time studies	36
b. Methods-time measurement	9
c. Past performance and records	54
d. Estimate	9
e. Other	23
5. Under what circumstances do you change the time standards or rates?	% of companies using plan
a. Change in method, tools, equipment or working conditions	54
b. Clerical error in computing the standard	18
c. At end of year or some regular time	18
d. When workers' earnings are too high	9
e. Other	18
6. In what ways do you feel that your company has benefited from your incentive plan?	% of companies using plan
a. Decreased unit cost and increased production	59
b. Simplified cost estimating	14
c. Decreased supervision required	36
d. Increased worker income	64
e. Other	9

or rates for incentive purposes. Portland area companies rely heavily on past performance records, while 91% of Los Angeles firms and nearly 99% of Eastern and Midwest firms utilize some form of time study to set such rates. Some firms reported using more than one method in all areas.

3. Changing time standards. Firms in the Los Angeles, East and Midwest areas normally change standards only with a change in the method or when a clerical error has been made. Companies in the Portland area make more changes at the end of the year and when worker's earnings are "too high."

Merit rating

1. If you use merit rating, what groups of employees are rated?	% of companies using plan
a. Direct labor	52
b. Indirect labor	42
c. Supervisory	62
d. Engineering	29
e. Other	24
2. Who applies merit rating in your plant?	% of companies using plan
a. Immediate superior	62
b. Top executive	52
c. Personnel department	10
d. Other	14
3. What advantages do you feel are achieved by your merit rating plan?	% of companies using plan
a. Better understanding of work and men	38
b. Increased production	14
c. Uncovers special abilities of men	38
d. Helps establish fair and equal pay	71
e. Other	24

The latter practice encourages or at least tolerates the setting of inaccurate standards and may cause operators to put an artificial ceiling on their production to keep the rates from being cut.

Merit rating practices

Again the clothing and textile group leads the field, while only one firm out of eleven in the lumber and wood products classification reported using this management tool.

Some office, clerical and sales personnel were mentioned in the "other" category of groups of employees.

Some firms mentioned that the merit ratings were made by the supervisors and approved by the personnel department.

"Other" advantages noted were that merit rating helps employees improve when they are shown the ratings, gives recognition for extra effort and tends to reduce labor turnover. The merit rating practices used in the Portland area cannot be compared with the practices used in other areas.

BACTERIA RESEARCH yields more copper

KENNECOTT Copper Corp., Utah Copper Division, is studying helpful bacteria which do not cause disease in either humans or animals but may be increasing the supply of copper.

Types of helpful bacteria probably have been active for years in the leaching of mine dumps not only in Utah but in many parts of the world. The significant fact is the discovery of the important part they play not only in the current production of copper but the greater possibilities when huge dumps of mine waste and very low-grade ores become more important sources of copper.

Research is being aimed at a fundamental study of these helpful organisms. What do they feed upon, under what conditions do they thrive, remain dormant, or die? are a few of the questions that must be answered. Can they be bred to tolerate a stronger acid and richer copper-bearing solutions? What is the effect of light and warmth upon them? What happens when they encounter minerals of other metals such as zinc, arsenic or manganese?

A new laboratory technique is being developed in Salt Lake City to further our understanding of natural processes which bear directly on the production of copper from low-grade materials. This investigation may contribute much to our understanding of extraction of metals by leaching processes throughout the world.



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 costs down*

You cut down rejects when you use Chase Brass and Copper Alloy Wire.

Chase mills inspect every coil of wire produced. No scratches, no slivers, spills, or laps! Chase wire is of uniform temper and grain size, uniform in surface texture and color, accurate in gauge. It comes to you clean and bright.

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Announcing... 2 NEW MODELS in ROPER 3600 SERIES



NOW! SIZES #5 and #6 WITH CAPACITIES FROM 70 TO 226 G.P.M. AT 60 P.S.I. FOR WIDER SCOPE OF APPLICATIONS FOR INDUSTRIAL USERS

These new MAHB models, with built-in gear reductions for use with standard motors, are now offered to meet the demands of larger general purpose installations. Various combinations of pump sizes, gear reduction ratios, and motor sizes are available to provide a range of capacities covering liquids as thin as gasoline and as thick as molasses.

FEATURES

- Compact . . . requires minimum installation space
- Totally-enclosed gear reduction running in oil
- Anti-friction bearings throughout gear reduction
- 3 gear reductions for each size are interchangeable
- Operates indoors or outdoors—no pump house needed
- Sturdy bedplate provides rigid mounting for pump and motor
- Unusually smooth and quiet operation

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Pacific Coast Office, Pump Division
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ROPER
Rotary Pumps

ATOMIC DEVICE protects hands



SHOULD HANDS enter danger zone. Geiger tubes (circled) pick up radiation from wristband and stop the machine.

INSTALLATION of an atomic safety device to protect the hands of punch press operators at the San Francisco maintenance base of United Air Lines opens a new field of industrial safety.

Operators of the accident-proof punch press wear wristbands containing radioactive crystals. Three Geiger tubes enclose the punching area—one at the front and one on each side of the zone where injuries can occur. If hands stray into danger, the tubes pick up radiation from the wristbands and instantly halt the machine.

As a further safety device, the punch press will not run unless the operator is equipped with the wristbands. An impulse from the radioactive crystals is required to trigger the machine for use. Within 15 seconds after the wristbands are withdrawn, the machine automatically shuts off.

SALT WATER powers boat

RALPH McCABE, an inventor living in Forks of Salmon, Calif., announces that he is ready to test-run his revolutionary boat which derives electrical power from ocean salt water.

The inventor said a 24-in. model ran continuously for five hours. He explains the boat's operation this way:

Ionization is obtained in salt water by the salt breaking down the hydrogen atoms and freeing electrical ions. The ions are picked up by positive and negative plates on the bottom of the boat. These supply electrical energy to the motor.

EXTRA AUXILIARY CONTACTS

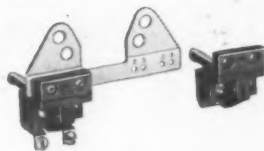
for ALL Allen-Bradley Starters . . . Sizes 0 to 7



Auxiliary Contacts—Sizes 0 & 1

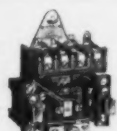
NOW . . . it's easy to add auxiliary contacts to A-B solenoid starters to operate extra relays, pilot lights, or other accessories. Just follow the steps shown below.

Bulletin 895 auxiliary contacts come in forms to fit all sizes of starters . . . with either single pole normally open, normally closed, or normally open-normally closed contacts. They can be added to any A-B starter in stock or in service.

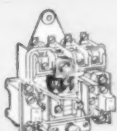


Auxiliary Contacts—Sizes 2 & 3

ADD ONE OR TWO AUXILIARY CONTACTS TO ANY A-B SOLENOID STARTER



Bulletin 709 Size 0 starter with auxiliary lock-in contact



Bulletin 709 Size 0 starter with one extra auxiliary contact



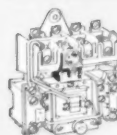
Bulletin 709 Size 0 starter with two extra auxiliary contacts

SIZE 0 STARTER

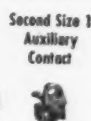
One or two extra auxiliary contacts can be mounted on Size 0 arc hood. Terminals are easily accessible from front. Rugged—simple—trouble free.



Bulletin 709 Size 1 starter with auxiliary lock-in contact



Bulletin 709 Size 1 starter with one extra auxiliary contact



Bulletin 709 Size 1 starter with two extra auxiliary contacts

SIZE 1 STARTER

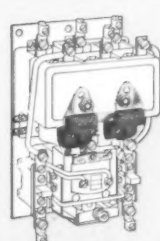
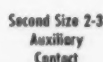
One or two extra auxiliary contacts can be mounted on Size 1 arc hood. Terminals are accessible from front. Existing wiring not disturbed in any way.



Bulletin 709 Size 2 starter with auxiliary lock-in contact



Bulletin 709 Size 2 starter with one extra auxiliary contact



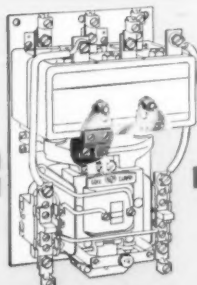
Bulletin 709 Size 2 starter with two extra auxiliary contacts

SIZE 2 STARTER

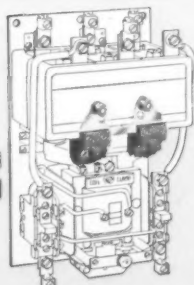
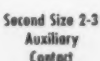
Mounting plate will hold one or two extra Size 2-3 auxiliary contacts. It is attached to starter using existing arc hood threaded studs and lock nuts. Solenoid plunger of starter actuates the auxiliary contacts.



Bulletin 709 Size 3 starter with auxiliary lock-in contact



Bulletin 709 Size 3 starter with one extra auxiliary contact



Bulletin 709 Size 3 starter with two extra auxiliary contacts

SIZE 3 STARTER

The Size 2-3 mounting plate will also fit the Size 3 arc hood and support one or two auxiliary contacts. Easy to install and simple to operate. Trouble free performance is guaranteed. No contact maintenance.

Contact arrangements are readily changed from normally open to normally closed, or vice versa. This flexibility opens new possibilities for applying Allen-Bradley contactors and starters to automatically controlled equipment.

Allen-Bradley Co.

1316 S. Second St., Milwaukee 4, Wis.



ALLEN-BRADLEY
MOTOR CONTROL

MAKE YOUR OWN TERMINAL STRIPS

EASILY MADE UP IN ANY LENGTH TO MEET
YOUR TERMINAL STRIP SPECIFICATIONS

Bulletin 892 terminal blocks interlock in perfect alignment to provide the exact number of terminals for any panel board. There are no excess terminals—hence, no waste of panel space. The required terminal strip can be assembled quickly and mounted on the panel with hold-down bolts. Plastic barriers separate the clamp-type terminals which have lock washers.

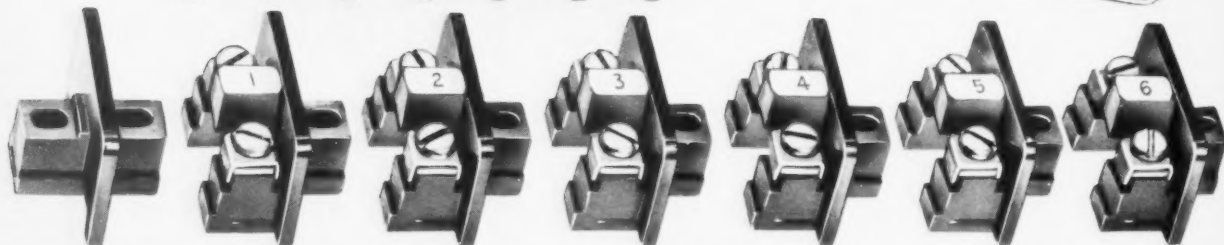
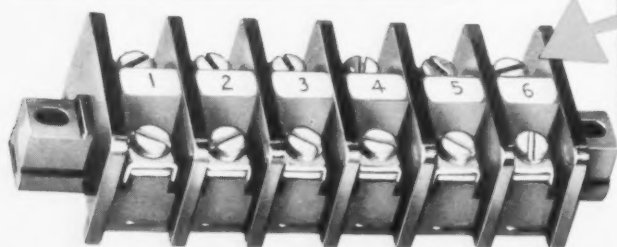
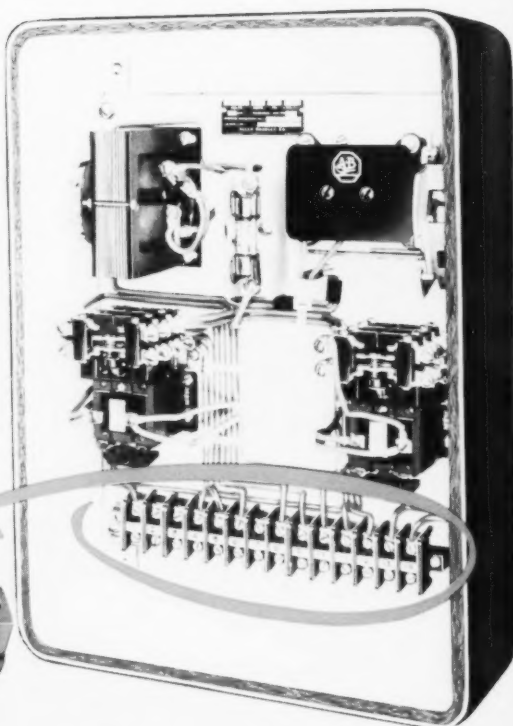
One end block and any number of terminal blocks may be hooked together. In general, every 13th block is used to secure a long terminal strip to the panel.

AVAILABLE IN TWO CURRENT RATINGS
15 AMPERES—25 AMPERES

Dimensions of Bulletin 892 Terminal Blocks

Ampere Rating	Width	Height	Over-all Length of 10 Blocks
15	1½"	1"	7"
25	1⅞"	1⅝"	8⅛"

with these handy
BULLETIN 892
TERMINAL
BLOCKS



INTERLOCKING TERMINAL BLOCKS

ALLEN-BRADLEY

QUALITY

MOTOR CONTROL



Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

HANDLING COSTS EXORBITANT?

Check yours against these

A detailed breakdown of cost of operation and ownership for lift trucks, elevators, conveyors, hand trucks, etc.

RESEARCH for the report summarized below was conducted in Washington State, which annually markets about one-third of the national supply of fresh apples. The project was handled by the Washington State Apple Commission's research department under a contract with the

U. S. Department of Agriculture, and was assisted by Frederick C. Winter, assistant professor of industrial engineering at Columbia University and consulting industrial engineer.

These figures are the result of a careful sampling of 32 of the state's 252 packing and storage houses and

were released only recently. The object of the survey was to find ways, on an industry-wide basis, for increasing the productivity of labor employed in apple-packing and storage houses, and to compare efficiency of various types and combinations of materials handling equipment.

Cost of ownership and operation of various types of materials-handling equipment used in apple packing and storage plants, 1952

TYPE OF EQUIPMENT	Amount of equipment	Initial cost (\$)	Years depreciation	Assumed use per year	OWNERSHIP COST PER YEAR				OPERATION COST PER YEAR			Total ownership and operating cost	
					Depreciation	Interest at 5%	Insurance and taxes at 2%	Total	Gas, oil, and electricity (2)	Maintenance	Total	Cost per year	Per hour of use
		Dollars	Number	Hours	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Clamp-type 2-wheel hand truck.....	one	74.10	20	400	3.70	1.85	1.48	7.03	....	2.50	2.50	9.53	0.024
Belt conveyor (100 ft.).....	205 ft.	471.50	15	....	31.43	....	....	....	....	....	....	....	....
Belting (\$2.30 per foot).....	one	99.75	25	....	3.99	....	....	....	....	....	....	....	....
Dip and load section.....	one	49.75	25	....	1.99	....	....	....	....	....	....	....	....
Curved end section.....	one	222.00	25	....	8.88	....	....	....	....	....	....	....	....
Motor.....	one	142.50	25	....	5.70	....	....	....	....	....	....	....	....
Idle ends.....	two	83.00	25	....	3.32	....	....	....	....	....	....	....	....
Floor supports.....	nine	54.00	25	....	2.16	....	....	....	....	....	....	....	....
Roller sections.....	ten	395.00	25	....	15.80	....	....	....	....	....	....	....	....
Installation (5%).....	....	75.87	....	....	3.03	....	....	....	....	....	....	....	....
Total.....	....	1,593.37	15-25	200	76.30	39.83	31.86	147.99	4.00	15.00	19.00	166.99	0.83
Floor chain conveyor (100 ft.)	200 ft.	1,650.00	....	....	....	....	....	....	....	....	....	....	....
Chain.....	one	780.00	....	....	....	....	....	....	....	....	....	....	....
Drive.....	one	162.00	....	....	....	....	....	....	....	....	....	....	....
Idle ends.....	....	259.00	....	....	....	....	....	....	....	....	....	....	....
Installation (10%).....	....	67.00	....	....	....	....	....	....	....	....	....	....	....
Freight.....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	2,918.00	15	300	194.53	72.95	58.36	325.84	6.00	15.00	21.00	346.84	1.16
Roller conveyor (100 ft.)	ten	325.00	....	....	....	....	....	....	....	....	....	....	....
Sections.....	eleven	55.00	....	....	....	....	....	....	....	....	....	....	....
Floor supports.....	one	35.75	....	....	....	....	....	....	....	....	....	....	....
90-deg. curve.....	....	76.50	....	....	....	....	....	....	....	....	....	....	....
Freight.....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	492.25	15	200	32.85	12.31	9.84	55.00	....	1.50	1.50	56.50	0.28
Portable mechanical lift	one	600.00	10	....	60.00	....	....	....	....	....	....	....	....
Machine.....	four	80.00	2	....	40.00	....	....	....	....	....	....	....	....
Batteries.....	....	....	2-10	300	100.00	17.00	13.60	130.60	....	(3)46.85	177.45	0.59	....
Industrial clamp truck (800-lb. capacity—gas—12-box load)	one	1,080.00	....	....	....	....	....	....	....	....	....	....	....
Machine.....	....	72.00	....	....	....	....	....	....	....	....	....	....	....
Freight.....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	1,152.00	10	250	115.20	28.80	23.04	167.04	34.00	30.00	64.00	231.04	0.92
Stackmaker (4) Machine.....	one	2,500.00	15	150	166.67	62.50	50.00	279.17	2.25 (5)20.00	22.25	301.42	2.01	....
Stackbreaker (6) Machine.....	one	2,000.00	15	(7)350	133.33	50.00	40.00	223.33	5.25 (5)20.00	25.25	248.58	.71	....
Elevator (8).....	one	13,375.00	20	400	668.75	334.37	267.50	1,270.62	5.00	10.00	15.00	1,235.62	3.21
Booster to accelerate packed boxes going into refrigerated car (9)	one	100.00	....	....	....	....	....	....	....	....	....	....	....
Motor.....	one	300.00	....	....	....	....	....	....	....	....	....	....	....
Labor and material.....	....	400.00	15	200	26.67	10.00	8.00	44.67	2.00	20.00	22.00	66.67	0.33
Total.....	....	1,150.00	15	150	76.67	28.75	23.00	128.42	(11)0.20	9.80	10.00	138.42	0.92
Hydraulic device to stabilize road truck bed (10)	one	850.00	....	....	....	....	....	....	....	....	....	....	....
Hydraulic units.....	one	100.00	....	....	....	....	....	....	....	....	....	....	....
Motor.....	one	100.00	....	....	....	....	....	....	....	....	....	....	....
Switch and wiring.....	....	100.00	....	....	....	....	....	....	....	....	....	....	....
Installation.....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	1,150.00	15	150	76.67	28.75	23.00	128.42	(11)0.20	9.80	10.00	138.42	0.92
Innovation to stabilize road truck bed (12)	....	20.00	....	....	....	....	....	....	....	....	....	....	....
Material.....	....	30.00	....	....	....	....	....	....	....	....	....	....	....
Labor.....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total.....	one	50.00	15	150	3.33	1.25	1.00	5.58	....	....	....	5.58	0.04

See footnotes at end of table

More on next page


Cost of ownership and operation of various types of materials-handling equipment used in apple packing and storage plants, 1952—Cont.

TYPE OF EQUIPMENT	Amount of equipment	Initial cost (\$)	Years depreciation	Assumed use per year	OWNERSHIP COST PER YEAR				OPERATION COST PER YEAR			Total ownership and operating cost	
					Depreciation	Interest at 5%	Insurance and taxes at 2%	Total	Gas, oil, and electricity (2)	Maintenance	Total	Cost per year	Per hour of use
		Dollars	Number	Hours	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Industrial clamp-type lift truck (1,000-lb. capacity—gas—24-box load)													
Machine.....	one	2,227.00	....	....	....	....	....	....	....	....	....	....	....
Clamp.....	one	627.00	....	....	....	....	....	....	....	....	....	....	....
Freight.....	....	178.00	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	3,032.00	10	400	303.20	75.80	60.64	439.64	124.00	88.00	212.00	651.64	1.63
												(13)	
Industrial clamp-type lift truck (1,000-lb. capacity—electric—24-box load)													
Machine.....	one	2,472.00	20	....	123.60	....	....	....	....	....	....	....	....
Clamp.....	one	627.00	20	....	31.35	....	....	....	....	....	....	....	....
Battery.....	one	762.00	7½	....	101.60	....	....	....	....	....	....	....	....
Charger.....	one	450.00	20	....	22.50	....	....	....	....	....	....	....	....
Freight.....	....	182.00	....	....	9.10	....	....	....	....	....	....	....	....
Total.....	....	4,493.00	7½-20	400	288.15	112.32	89.86	490.33	(14)	(14)	76.00	566.33	1.42
Industrial clamp-type lift truck (2,000-lb. capacity—gas—36-box load)													
Machine.....	one	2,641.00	....	....	....	....	....	....	....	....	....	....	....
Clamp.....	one	627.00	....	....	....	....	....	....	....	....	....	....	....
Freight.....	....	292.00	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	3,560.00	10	400	356.00	89.00	71.20	516.20	131.50	80.50	212.00	728.20	1.82
Industrial clamp-type lift truck (2,000-lb. capacity—electric—36-box load)													
Machine.....	one	3,567.00	20	....	178.35	....	....	....	....	....	....	....	....
Clamp.....	one	627.00	20	....	31.35	....	....	....	....	....	....	....	....
Battery.....	one	1,092.00	7½	....	145.60	....	....	....	....	....	....	....	....
Charger.....	one	450.00	20	....	22.50	....	....	....	....	....	....	....	....
Freight.....	....	328.00	....	....	16.40	....	....	....	....	....	....	....	....
Total.....	....	6,064.00	7½-20	400	394.20	151.60	121.28	667.08	38.00	38.00	76.00	743.08	1.86
Industrial fork-lift truck (2,000-lb. capacity—gas—36-box load) (15)													
Machine.....	one	2,741.00	....	....	....	....	....	....	....	....	....	....	....
Freight.....	....	292.00	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	3,033.00	10	400	303.30	75.82	60.66	439.78	131.50	80.50	212.00	651.78	1.63
Industrial fork-lift truck (2,000-lb. capacity—electric—36-box load) (15)													
Machine.....	one (16)	3,667.00	20	....	183.35	....	....	....	....	....	....	....	....
Battery.....	one	1,092.00	7½	....	145.60	....	....	....	....	....	....	....	....
Charger.....	one	450.00	20	....	22.50	....	....	....	....	....	....	....	....
Freight.....	....	328.00	....	....	16.40	....	....	....	....	....	....	....	....
Total.....	....	5,537.00	7½-20	400	367.85	138.42	110.74	617.01	38.00	38.00	76.00	693.01	1.73
Industrial fork-lift truck (4,000-lb. capacity—gas—48-box load)													
Machine.....	one	3,598.00	....	....	....	....	....	....	....	....	....	....	....
Freight.....	....	444.00	....	....	....	....	....	....	....	....	....	....	....
Total.....	....	4,042.00	10	400	404.20	101.05	80.84	586.09	165.00	91.00	256.00	842.09	2.10
Industrial fork-lift truck (4,000-lb. capacity—electric—48-box load)													
Machine.....	one	4,729.00	20	....	236.45	....	....	....	....	....	....	....	....
Battery.....	one	1,397.00	7½	....	186.27	....	....	....	....	....	....	....	....
Charger.....	one	690.00	20	....	34.50	....	....	....	....	....	....	....	....
Freight.....	....	455.00	....	....	22.75	....	....	....	....	....	....	....	....
Total.....	....	7,271.00	7½-20	400	479.97	181.77	145.42	807.16	48.05	55.95	104.00	911.16	2.28
Low-lift pallet transporter (4,000-lb. capacity—electric—48-box load) (17)													
Machine.....	one	1,326.00	20	....	66.30	....	....	....	....	....	....	....	....
Battery.....	one	289.00	7½	....	38.53	....	....	....	....	....	....	....	....
Charger.....	one	345.00	20	....	17.25	....	....	....	....	....	....	....	....
Freight.....	....	137.00	20	....	6.85	....	....	....	....	....	....	....	....
Total.....	....	2,097.00	7½-20	200	128.93	52.42	41.94	223.29	(14)	(14)	76.00	299.29	1.50
Dunnage strips used between industrial clamp truck unit loads to stabilize stack in storage (24-box loads—2 loads high) 1 in. x 4 in. x 2 ft. strips for 1,000 boxes at \$50.00 per 1,000 bd. ft. 41.6 bd. ft. 2.08													
Pallets—36-box (36 x 40 in.)	....	....	....	....	....	....	....	....	....	....	....	....	....
Pallets for 1,000 boxes at \$2.80....	27.8	77.84	15	(18)4.74	5.19	1.95	1.56	8.70	....	0.46	(19)0.46	9.16	1.93
Pallets—48-box (40 x 48 in.)	....	....	....	....	....	....	....	....	....	....	....	....	....
Pallets for 1,000 boxes at \$3.00....	20.8	62.70	15	(18)3.64	4.18	1.57	1.27	7.02	....	0.35	(19)0.35	7.37	2.02
Pallet dolly for loading out	....	....	....	....	....	....	....	....	....	....	....	....	....
Dolly.....	one	42.85	5	200	8.57	1.07	0.86	10.50	....	1.00	1.00	11.50	0.06

- (1) Based on cost in Washington State.
- (2) Average costs in the industry—gasoline at \$0.25 a gallon, oil at \$0.40 a quart, electricity at \$0.01 a kilowatt-hour.
- (3) Operation costs cover recharging storage battery after every 2 hours of use for stacking, after every 8 hours for breaking out high-piled boxes, at rate of \$0.50 per battery charge (150 hours stacking, 150 hours stackbreaking). This cost may be reduced if a plant installs its own charger.
- (4) Machine builds single boxes into 6-high stacks of boxes.
- (5) Cost may be reduced with improved models.
- (6) Machine breaks down 6-high stacks of boxes to single boxes.
- (7) Relatively large number of hours because machine breaks stacks for packing line.
- (8) Eight-thousand pound capacity, lift 40 feet, 10 horsepower motor, push button "dead man" control, lift speed 20 feet per minute, platform 8 by 10 feet.
- (9) Made by plant, not available commercially. Used instead of a man to push boxes on a roller conveyor from the doorway to the ends of a refrigerator car.
- (10) A hydraulic unit which holds truck bed solid against a loading dock and allows industrial equipment to operate on truck bed.
- (11) Electric motor runs only part of the time that the hydraulic dock is in use.
- (12) Made by plant. Metal frame wedge projecting from the loading dock. As truck is backed up, the metal frame pries the end of truck bed to an even height with loading dock to allow industrial equipment to operate on road truck bed. (Will usually operate properly with only the one or two road trucks it is made for.)
- (13) The operation cost for this 1,000-pound gasoline powered industrial clamp-type lift truck appears high compared to the 2,000-pound and 4,000-pound machines. Costs taken from plant using two 1,000-pound lift trucks over period of 4 years.
- (14) No actual costs available; taken from 2,000-pound electric industrial lift trucks.
- (15) Recently there has been a trend toward buying the 4,000-pound capacity fork truck in 36-box pallet plants which tier pallets 3 high, because extra lift height must be added to the standard 2,000-pound model. The additional cost of about \$100 between the 4,000-pound and 3,000-pound model makes the jump to 4,000-pound trucks worthwhile to most operators.
- (16) One hundred dollars added for extra lift necessary.
- (17) Operator walking type.
- (18) Estimated hours of use arrived at by counting the time during which the pallets or dunnage strips are being handled, based on the number of hours of work required per 1,000 boxes in all phases of handling. (Storage time not considered.)

	Receiving to storage	Storage to line	Line to storage	Storage to shipping out	Miscellaneous (culls, empty boxes, etc.)	Total man-hours per 1,000 boxes
Dunnage strips.....	1.04	1.13	1.48	1.04	....	4.69
36-box pallet .....	.72	.78	.85	.81	1.58	4.74
48-box pallet .....	.55	.62	.63	.63	1.21	3.64

(19) Maintenance at \$0.25 per pallet life.



**SPECIAL
TODAY**

How good a buy is a bargain?

Valves are no exception in "bargains" offered every day. Maybe you could afford to buy such valves—if you didn't look beyond the price tag . . . didn't care about quality . . . didn't figure their real cost.

But you're aware of current maintenance labor rates. You know the labor part of piping installations has grown bigger and bigger . . . that valve repairs aren't the small jobs they used to be. So you want greater assurance of dependability—not fictitious savings in price.

Buying with an eye to real value marks today's thrifty buyer. That's why he prefers traditionally dependable Crane quality. He knows it means longer life, greater freedom from trouble . . . and that Crane puts such quality into piping equipment for every need.

Crane Co., General Offices: 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas.



CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

go ahead and be a brute!

you don't have to baby

BRONCO⁶⁰ Certified portable cords and cables

Don't worry about oil, acids, alkalis . . .
BRONCO 60 Certified has a jacket rich in oil
and chemical-resistant Neoprene.
It is certified to contain not less than
60% Neoprene by weight.



Sunlight? Ultra-violet rays? Ozone?
They can't break down the 60% Neoprene
protecting jacket on BRONCO 60 Certified.

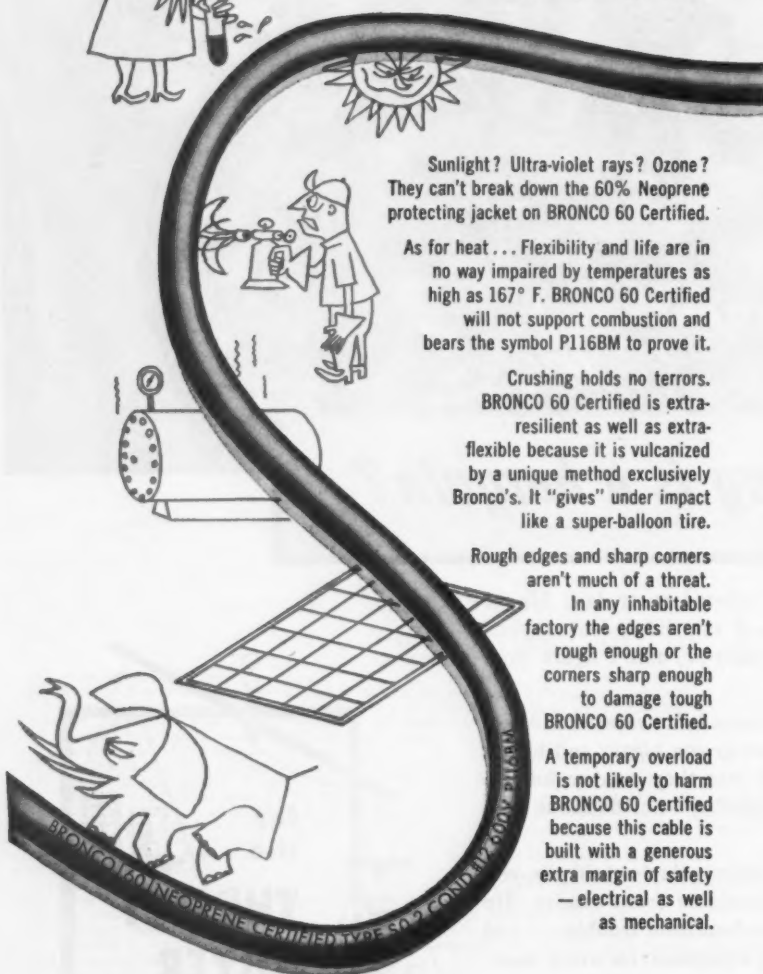
As for heat . . . Flexibility and life are in
no way impaired by temperatures as
high as 167° F. BRONCO 60 Certified
will not support combustion and
bears the symbol P116BM to prove it.

Crushing holds no terrors.
BRONCO 60 Certified is extra-
resilient as well as extra-
flexible because it is vulcanized
by a unique method exclusively
Bronco's. It "gives" under impact
like a super-balloon tire.

Rough edges and sharp corners
aren't much of a threat.

In any inhabitable
factory the edges aren't
rough enough or the
corners sharp enough
to damage tough
BRONCO 60 Certified.

A temporary overload
is not likely to harm
BRONCO 60 Certified
because this cable is
built with a generous
extra margin of safety
— electrical as well
as mechanical.



**WESTERN INSULATED
WIRE CO.**

Los Angeles 58,
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Sold nationally by
Electrical Wholesale
Distributors

A SHORT COURSE on corrosion

PROGRAM PLANS for the 1954 annual short course on corrosion held by the National Association of Corrosion Engineers are well under way. The five-day course, to be held on the campus of Washington State College at Pullman, February 1-5, 1954, will present a brief but intensive review of the fundamental aspects of corrosion, followed by panel discussions and lectures on the applications of corrosion control in industry. The course is sponsored by the Division of Industrial Services of the Washington State Institute of Technology.

SHELL MOULDING pays on small runs

A 65% SAVING in cost was achieved by using a shell mould process of casting for producing less than 1,000 shifting control cams for the ordnance division of Food Machinery & Chemical Corp.

Mr. A. G. Dimond, production engineer for Food Machinery & Chemical Corp., in a recent talk at a shell moulding seminar at Reichhold Chemicals Inc., South San Francisco, indicated that shell mould casting is a solution in the search for cost reduction methods on cast parts. However, he said, it is far from being a cure-all, and it is his belief that it will not prove out unless foundry, design and manufacturing, work in close relationship.

"It has been said that this process should only be considered on a high production part. This is not altogether true and it is my experience that the part can be successfully shell moulded at the right price, provided the amount of reduced machining in the part and the quantity involved offset the die costs.

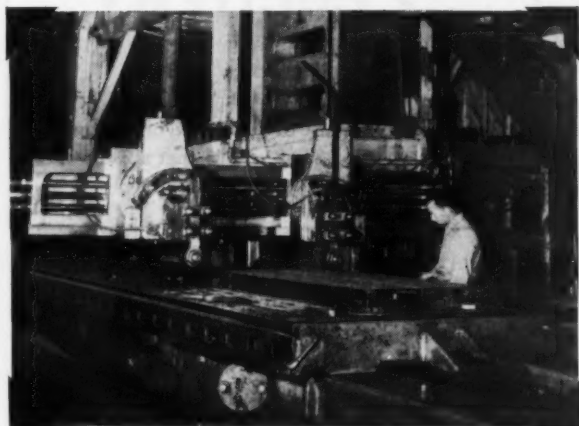
"Briefly, parts must be pre-designed for shell moulding so that the part lends itself to the process. The end result must be kept in mind, and production methods on the sand casting must be analyzed to determine just what machine costs can be eliminated. Such operations as milling bosses, cam tracks, face plates, etc., in most cases can be done away with as the part can be shell molded to drawing dimensions.

"Not all metals that are cast can be shell moulded and held to rigid dimensional tolerances. The shifting control cam produced for FMC had two cam follower slots. It was found that the cam could be cast in ductile iron, which, when heat treated to a

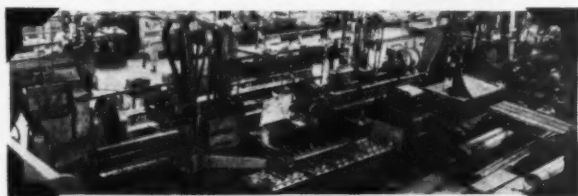
STANDARD ENGINEER'S REPORT

	DATA
LUBRICANT	Calol Vistac Oil
UNIT	72" open-side planer
OPERATION	Machining heavy-duty metal parts
CONDITIONS	Extreme pressures
PERIOD	4 years
FIRM	Lamb-Grays Harbor Co., Hoquiam, Wash.

Tacky oil on planer ways assures precision work!



WHEN CALOL VISTAC OIL replaced another lubricant on the main ways of this 72" open-side planer, its constant, even film helped to assure truer cuts for the Lamb-Grays Harbor Co., Hoquiam, Wash. Previous oils used by the company had gummed quickly, left deposits on ways, and seriously affected precision.



"NO TROUBLE OF ANY KIND" is the report from Lamb-Grays Harbor Co. since they changed to Calol Vistac Oil in 1948. Calol Vistac Oil is also used in reduction gears, motor heads, air-tools, and heavy-duty plain bearings. It comes in several grades and may be applied by wick-, ring-, or drip-feed oilers.



FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, is ready for you. Write or ask for your free copy today.

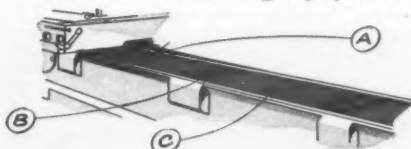


TRADEMARK "CALOL" REG. U.S. PAT. OFF.



THE PRESSURE-RESISTANT FILM of Calol Vistac Oil stays on the ways even under extreme loads. For example, when work weighing up to $7\frac{1}{2}$ tons was carried on the 10-ton bed of this planer, the "high-oiliness" film did not squeeze off, despite the $17\frac{1}{2}$ ton load.

How Calol Vistac Oil Cuts Costs on Metal-Machining Equipment



On machine ways, in hoist gear sets, motor gear-heads, air hammers, heavy-duty plain bearings—stays put and saves wear because of viscous, tacky nature. Atomizes quickly and stays fluid at low temperatures.

- A. Special additives help form oily, pressure-resistant lubricating film...won't run off slow-moving parts.
- B. Economical—small quantity will lubricate efficiently, dissipate heat.
- C. Tenacious film cuts power loss and wear.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

developed formula, would grow back to drawing dimension and retain metallurgical properties required of the part.

"These cams were cast without draft on the track, and the flatness of the piece was within acceptable limits. The piece was originally designed to be fabricated from 1/2-in. steel plate. Success in this development project was due to the close liaison between Homer Cobler of Vulcan Foundry and Robert Smith, chief metallurgist, and Earl Pearsell, design engineer of FMC."

NONDISCRIMINATION union agreements

MORE THAN one-third of the workers covered by all contracts included in a survey by the California Division of Labor Statistics and Research were employed under the terms of 53 contracts containing nondiscrimination clauses.

The clauses analyzed related chiefly to nondiscrimination in hiring. The clauses involved race, creed, national origin, sex and age. Equal-pay-for-equal-work clauses, requiring the same rate of pay for women as for men on

the same job operation, were not included.

Discrimination in hiring because of

race, creed or national origin was prohibited by the terms of 34 contracts covering 72,660 workers.

Safety training would pay

"IN 1952 the California insurance companies paid out for medical attention and compensation to injured workmen over \$90,000,000. This was the direct cost of accidents only.

"If we use an average figure of five times the direct cost for the indirect cost, we will find that industrial injuries cost California industry nearly half a billion dollars last year."

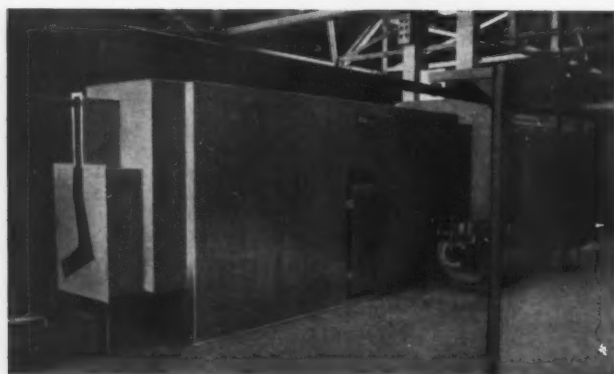
—Thomas Soule, Chief Safety Engineer,
Industrial Indemnity Co., San Francisco.

Note: The indirect costs, according to Mr. Soule, include such items as:

1. Lost time and wages of injured employee.
2. The employee's loss in earning power.
3. The economic loss to worker's family.
4. The loss of efficiency in the plant or on job through the breakup of the crew.
5. Lost time by supervisors.
6. The cost to replace the injured man.
7. Cost of the damage to tools and equipment.
8. Waste due to spoiled work.
9. Failure of employer to fill orders because of delays and breakdowns.
10. There are at least 100 other items of indirect cost that appear one or more times in connection with every accident.

For NATIONAL AUTOMOTIVE FIBRES Inc.

another COMPLETE FINISHING SYSTEM installed by



View of ROSS Paint Bake Oven. Conveyor system is arranged to accommodate spray booths and oven plus an assembly area for automobile seat frames.

Ross
ENGINEERING

The complete ROSS System now operating in the Oakland, California plant of National Automotive Fibres, Inc. consists of Conveyor System, Spray Booths and Paint Bake Oven. Another of America's leading manufacturers who rely upon Ross Engineering to provide finer, faster finishing for quality products.

See our Catalog in Sweet's Engineering File or write for copy.



J. O. ROSS ENGINEERING
CORPORATION

MANUFACTURERS OF AIR PROCESSING SYSTEMS

600 ST. PAUL AVE., LOS ANGELES

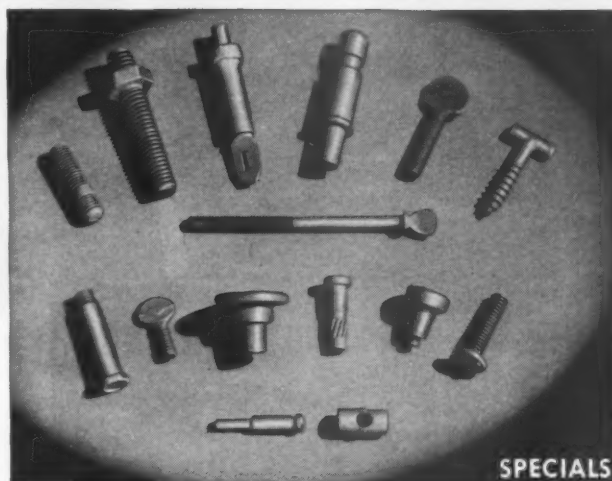
823 SKINNER BLDG., SEATTLE

For Western-made Fasteners

and the complete
NATIONAL line



STANDARDS



SPECIALS

Remember **THESE FACTS** whenever you need fasteners:

1. National's Los Angeles plant makes a complete line of standard fasteners, including the Phillips Recessed Head types.
2. National can help you design and can make for you, by cold-heading, almost any kind of special fastener.
3. Here in Los Angeles, we're headquarters for the complete National line, the most complete made by any manufacturer . . . everything you need in fasteners.
4. Our Los Angeles location is strategic . . . less than 24 hours shipping time away from your plant in the Pacific area.

National's modern production equipment and strict quality control assure you at all times of the very best in fasteners. Call your National representative in San Francisco, Seattle or Denver . . . or contact us direct, for your fastener needs.

NATIONAL SCREW & MFG. CO. OF CAL.

3423 So. Garfield Ave., Los Angeles 22, Cal.

Div. of The National Screw & Mfg. Company, Cleveland 4, Ohio



FASTENERS



MODELL CHAINS



CHESTER HOISTS



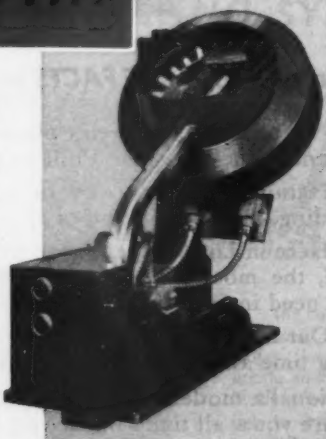
PRODUCTION *Pacemakers* in MODERN INDUSTRY



DPS SCREWDRIVERS
and Motorized
HOPPERS . . .

PROVIDE ASSEMBLY SPEED THAT CLEARS THE WAY FOR FASTER, UNINTERRUPTED OUTPUT

• Your production program need not be retarded by outmoded assembly methods . . . Substitute slow, manual handling with speedy, mechanical action . . . Use DPS modern power-driven equipment . . . Benefit by the advantages of lower labor costs, on-time deliveries, greater profits . . . Detroit Power Screwdrivers and Motorized Hoppers have brought about a new era in the feeding and assembly field. Find out quickly how these advanced machines



can be adapted to your requirements . . . Send samples now for detailed information.

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417 First Ave., So., Spokane 8, Wash.

DETROIT POWER SCREWDRIVER CO.

"I. E." INSTITUTE coming up

THE SIXTH annual Industrial Engineering Institute of the University of California will be held in Berkeley on January 29 and 30 and in Los Angeles on February 1 and 2, 1954.

Purpose of the conference is to present fundamentals and recent practical applications in the field of industrial engineering and management as well as the results of industrial engineering research performed at the University and throughout the country.

The conference will include sessions on the following topics:

- Industrial engineering in small business
- Human factors in engineering design
- Office work simplification
- Tool engineering and the selection of manufacturing processes
- Small business organization and management
- Human engineering and industrial psychology
- Recent developments in production engineering techniques
- Design changes and lower production costs
- Recent results of industrial engineering research.

CUSHIONED COUPLING for freight cars

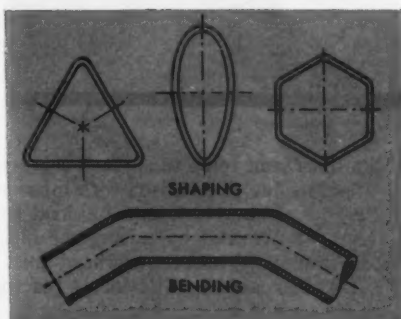
A DEVICE for cushioning the coupling of freight cars is being sought by the Southern Pacific Railroad to improve service to its shippers. The railroad has engaged Stanford Research Institute, Palo Alto, Calif., as consultants on the project.

Indications are that a form of shock absorber, built into the center sill of new cars and actuated hydraulically, appears to hold most promise. Action of the hydraulic part of the device would increase the cushioning effect in proportion to the impact on the couplers, thus preventing damage to cars or lading when cars are coupled at speeds in excess of safe limits.

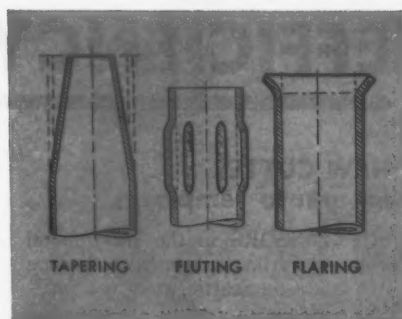
STRETCH-FORMING of thin gauge metal

LONGREN Aircraft Co., Torrance, Calif., has successfully completed attempts to stretch form .005 Type 302 stainless steel foil and .005 Inconel foil using Longren type hydraulic stretch presses with hydraulic flexible skin jaws. This is the first time material of such thin gauge has been stretch-formed.

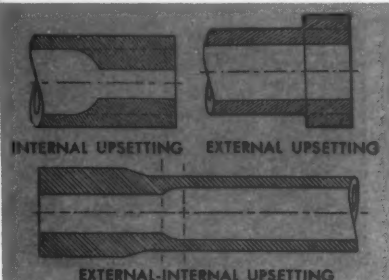
The project proves that this method of forming materials can be successfully applied to forming foil used in laminated honeycomb insulating panels being designed into new types of aircraft.



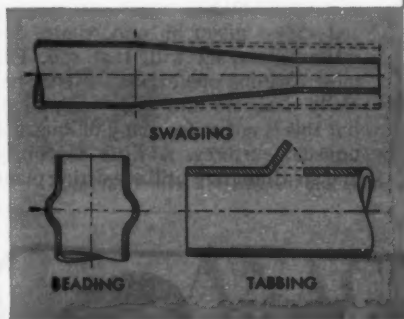
OSTUCO
TUBING
is versatile!



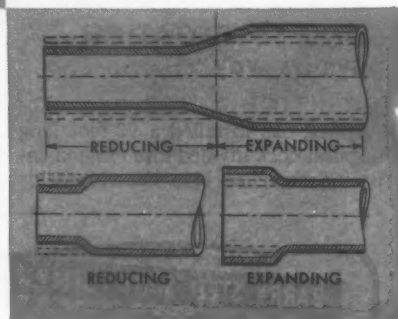
OSTUCO
TUBING
is versatile!



OSTUCO
TUBING
is versatile!



OSTUCO
TUBING
is versatile!



you draw the blueprint...we'll deliver the goods

There's practically no limit to the things OSTUCO can do with Seamless and Electric Welded Steel Tubing to help you produce lighter, stronger, better looking products at lower cost. Only a few of the operations are shown above.

Newly expanded and modernized facilities for *manufacturing, forging, and fabricating* tubing, all in one plant—plus our own steel source as a member of the Copperweld family

—speed deliveries, assure highest quality and save you money.

Tubing is our business, not a side line. OSTUCO's unique "Single Source" operation, with unified production control, eliminates shipments from one location to another . . . greatly reduces rejects . . . prevents errors . . . puts an end to buck passing and red tape. You write one order, get one bill, and responsibility is clearly fixed. Write for informative catalog, "Ostuco Tubing."



OHIO SEAMLESS TUBE DIVISION of Copperweld Steel Company

Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
Plant and General Offices: SHELBY, OHIO



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EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY, 117 Liberty Street, New York 6, N. Y.

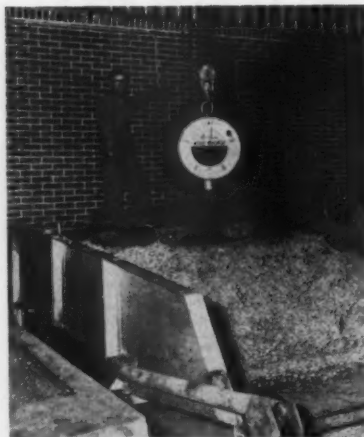
EFFICIENCY KINKS

NEW CUTTER for photo templates

SUPERVISORS in the sheet metal bench and trim department at Boeing Airplane Co., Seattle, were not satisfied with the procedure for rounding template sheet corners using a hand-operated arbor press. They referred the problem to the manufacturing research unit of Boeing's tool engineering department. The solution, designed by Tool Engineer Wesley Lund, is a cutter not much larger than a rivet gun which can cut corners twice as fast as the old machine. It shears metal as tough as .090 annealed stainless steel at a total shearing load of 7,020 lbs.

SCRAP SEGREGATION pays its way

MCCULLOCH MOTORS Corp., Los Angeles, has installed a 92-foot long disposal dock divided into one-ton capacity sheet-steel bins. Each bin holds



SCRAP METAL from McCulloch Motors is carefully segregated and weighed according to classification in order to obtain the highest possible price.

a different type of scrap. Some of these grades of scrap are more valuable than others and consequently can be sold at higher rates per ton.

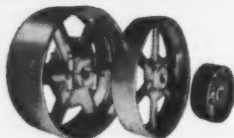
This same scrap would have a lower resale value when mixed with inferior grades, however. Every bin-load of scrap is weighed by raising the bins to truck level with an overhead hoist. A Dillon weight indicator is placed between the hoist and the bin for tallying each lift.

McCulloch expects to pay for this disposal dock and scale in less than two years with the money saved by segregating and weighing its scrap. Highest prices are assured because sales are made on a day-to-day basis to take advantage of current prices.

CONVEYOR BELTS cleaned in spinach washers

NO CLEANING agent can remove soil unless given an opportunity for intimate contact with that soil. For most cleaning operations there is specially designed and built equipment, but this is not so for many unique and unusual surfaces. A little ingenuity and an attempt to utilize existing plant

BARRY STEEL SPLIT PULLEYS



Scientifically designed. Electrically welded. Light weight. Easily installed. Maintains exact shape under all loads.

DICK'S BALATA BELTING



Hard surface, closely woven duck, thoroughly impregnated with Balata Gum. Free from stretch and shrinkage. Moisture resistant. High in power transmission efficiency.

WHY THE **Dick** LINE BOOSTS PRODUCTION...SHRINKS COSTS

Barry Conveyor Pulleys... Barry Steel Split Pulleys... QD Quick Demountable Sheaves... and Dick's Balata Belting shrink maintenance costs because they're constructed for efficient, economical, rugged service. Feature by feature, each item of the Dick line is carefully engineered to boost production through maximum strength and long-term durability.



BARRY CONVEYOR PULLEYS

Combines light weight with super strength. Welded steel construction. Easily installed. Wide range of sizes for all general conveyor services.



DICK ROPE QD—Quick Demountable—SHEAVES

A new sheave for new applications and modernizing old equipment. Advance design permits easy installation and removal without driving or pulling. Sheaves grip shaft over entire length, eliminating wobble and loss of concentricity.



R.&J. Dick COMPANY, INC.
PASSAIC, N. J.

SAN FRANCISCO, CALIF., 510 BRYANT ST.
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MUTUAL 1922

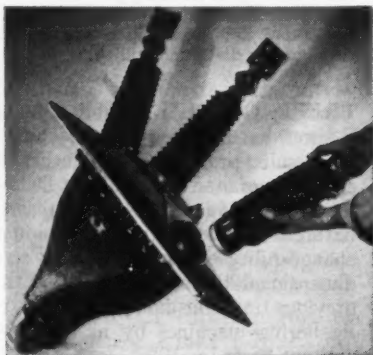


Lugs, insulators, bell shapes, and cable entrances are all interchangeable. This is an important feature of Anaconda Potheads.

ANACONDA POTHEADS

This complete line is engineered by power-cable specialists for use with *any* make of cable. Parts are *fully* interchangeable for greater adaptability, faster delivery, easier installation and lower cost.

Not hundreds—but thousands of different ANACONDA Potheads can be made up from relatively few interchangeable parts. There's a type for every use—capnut, transformer, switch-gear, disconnect, and through types.



Replacement of damaged insulators is simple on Anaconda Potheads. Note the ease with which any insulator can be quickly inserted.

Over 2000 different pothead assemblies can be furnished from standard parts for any particular conductor size and voltage rating in the multi-conductor capnut type alone!

To keep pace with the increasing demand for ANACONDA Accessories, it has been necessary again to greatly increase the facilities of the Cable Accessories Department. This Department is now in a position to promise prompt shipment on most of your orders.

Service continuity demands both power cable and its accessories built to highest standards. Top performance from ANACONDA Cable Accessories is assured because they are designed by engineers who are power-cable specialists.

Make Anaconda your headquarters for potheads, jointing kits, insulating compounds, paints, etc. For help on your cable and installation problems

call on your Anaconda Representative to get the benefit of Anaconda's engineering experience.

88461

Accessories for all types and sizes of bare and insulated conductors.

ANACONDA[®]

Anaconda Wire & Cable Company,
25 Broadway, New York 4, N. Y.

Send me Anaconda's new 100-page Pothead and Terminal Catalog for use as a reference book and to simplify ordering and specifying.

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ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.



Another good way to put the skids under your handling costs

Through the packaging magic of Signode Steel Strapping!

Shown here is a successful adaptation by Signode of a *basic* skid-loading method, made for a shipper of tin plate.

This commodity can easily be a shipper's headache. It is heavy and slippery, and its surfaces are vulnerable — easily dented and scratched.

So Signode engineers wrapped each unit in heavy, moisture-repellent kraft paper, placed metal protectors on the edges, and fastened it to a skid with Signode Steel Strapping. Results? Safer, easier handling at lower cost!

Can Signode help you cut handling and shipping costs through practical adaptations of one or more *basic* skid-loading methods? *It costs you nothing to find out!* Write Signode Steel Strapping Co., 458 Bryant Street, San Francisco 7, Calif., 659 E. Gage Avenue, Los Angeles 1, Calif. Offices coast to coast. In Canada: Canadian Steel Strapping Co., Ltd. Foreign subsidiaries and distributors world-wide.

SIGNODE Steel Strapping Co.

SEND FOR FOLDER SHOWING 6 BASIC WAYS OF UNITIZING

EFFICIENCY KINKS

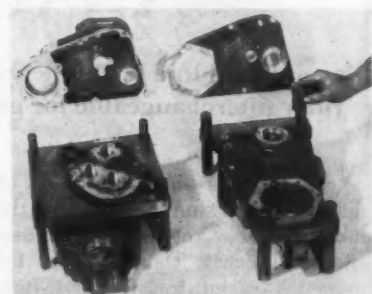
equipment may result in great savings in time and equipment, with an increase in efficiency.

Frank M. Wilson Co., a Stockton food processor, dissatisfied with manually cleaning miles of rubber conveyor belts, sought a more efficient method for bringing together the cleaning agent and soiled belts. These belts, used to convey spinach, get quite soiled and floor scrubbing fails to remove all the dirt, mold and slime, besides taking up considerable time.

At clean-up time after the spinach run it was noticed that the spinach washer, an unusually long arrangement, was also idle. When the conversion was complete, the processor had the equivalent of a three phase washing machine, providing for soak, scrub and rinse phases.

Soak section is 30 ft. long by 4 ft. wide and 2 ft. deep; the rinse section is 40 ft. long. The converted machine has to date cleaned literally miles of rubber belting, doing a job superior to any done by the scrub and turn method. The ability to improvise has saved over 500 man-hours to date. —Oakite Products, Inc.

REAMING FIXTURES save time, money



ALIGNMENT-CHECKING fixture for azimuth drive gear housing proves out correct location of bores and dowel pin holes and determines face squareness. Any casting distortion will show up here.

PRECISION BUILT hand reaming fixtures have been a large factor in overcoming production bottlenecks on airborne radar antenna units at Dalmo Victor Co., San Carlos. These master fixtures, providing complete interchangeability of parts with near zero dimensional limits have reduced the previous time-consuming operation on jig boring machines by nearly 75% and cut costs by 10%.

Formerly, components had to be pre-assembled and alignment insured by the use of specially ground plug

gages and by hand drilling and ream-
ing mating parts.

To meet the extremely close dimensions required to insure interchangeability in final assemblies, construction of the master reaming fixtures presented a problem in fixture stability to assure constant reproduction of dimensions.

Meehanite castings are utilized as a supporting foundation for the balance of the fixture assembly. The castings are rough machined, stress relieved and ground true for face location of parts to be reamed. Bores for reamer journal guides and locators must be held within very close dimensional limits on a jig borer. Where production drawings allow plus or minus .0005 in., jig boring tolerances on the fixtures are held to practically zero limits.

Journal guides and caps, reamer bodies and shanks are fabricated of high carbon steel, rough machined, normalized and carburized. Tungsten carbide inserts are brazed to reamer flutes and the entire unit ground on centers to near-zero concentricity and to the nominal diameter on the production part to be made.

All critical dimensions are checked with precision gage blocks and special gaging equipment. An additional check is made by inspecting the fixture and the first part run on the jig borer.

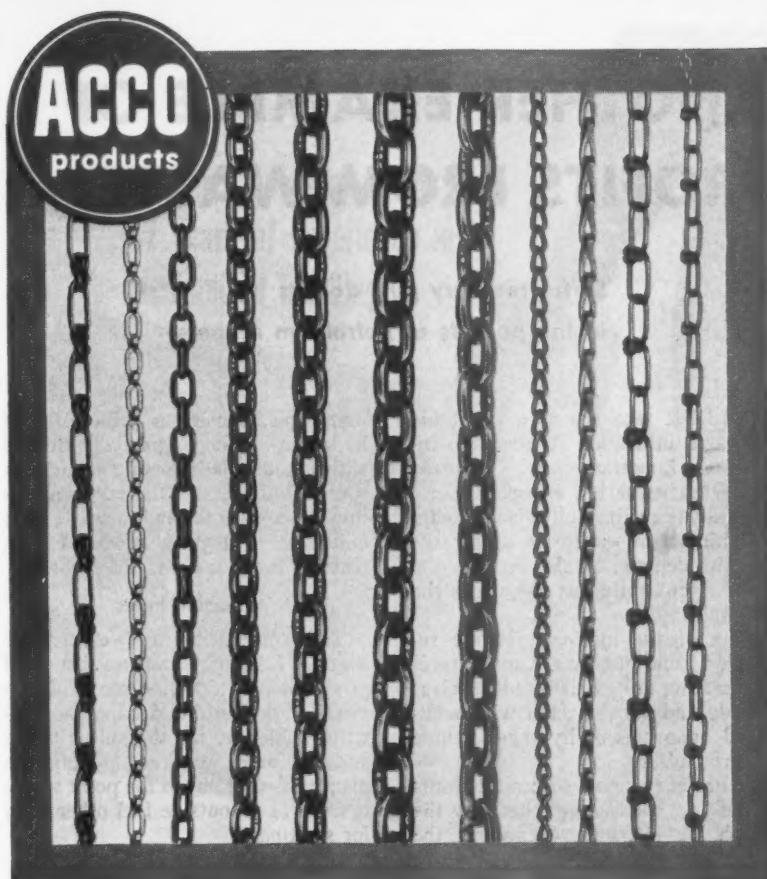
Besides providing precise alignment and interchangeability of parts, the fixtures eliminate match markings formerly used, hold scrap parts to a minimum and greatly reduce bench inspection time.

Contributions wanted

For each contribution to Efficiency Kinks which the editors feel merits publication, WESTERN INDUSTRY will be happy to pay \$5. Please send in any details of how your plant solved some problem of design, production, maintenance, or process.

We are particularly interested in ideas that contribute to the efficiency of production and the reduction of operating costs, novel or new methods of pollution reduction and waste utilization as well as adaption of old tools and processes to do new jobs.

Send all contributions to Efficiency Kinks Editor, 609 Mission St., San Francisco, Calif.



Why does AMERICAN make All Basic Chain Patterns?

• Although two chains may look alike, their end uses differ, resulting in poor service if a substitution is made. For instance, the three heavy welded chains in the middle above appear almost identical except for size. Yet one is designed for general service where great strength is not required, one is for logging, while the third is for heavy duty service.

The same thing applies to the weldless chains. Take the two stamped, flat link chains: the safety chain near the left, and the sash chain near the right side. One has only to keep something from being lost; the other must carry weight and run over a pulley. Alike in looks, yes—but that's as far as it goes.

Probably we can suffice by saying—"AMERICAN makes all basic chain patterns so you can get the best (and most economical) chain for your every use."

Your AMERICAN CHAIN distributor stocks many popular chains. Call him at once for recommendations, or write our York office.

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ANOTHER EXAMPLE OF PROFITS FROM WASTE

*Sulfur recovery puts dollars
in the pockets of petroleum refiners*

SULFUR recovery as a profitable waste utilization is assuming increasing importance in California petroleum refineries, especially since naturally occurring sulfur is gradually becoming more expensive as present deposits deplete. It also reduces the discharge of sulfurous gases into the atmosphere.

Part of the hydrogen sulfide recovered from refinery gas and natural gas treating units is reduced to sulfur dioxide and then reacted with additional quantities of hydrogen sulfide to form sulfur.

In one of the most successful plants in the Los Angeles area, built by the Ralph M. Parsons Company, the

waste gas, consisting principally of hydrogen sulfide, is partially burned with a controlled amount of air in a special burner, and the hot combustion gases pass through a waste heat boiler where steam is produced from reaction heat for use in the plant.

Reaction heats

The combustion and exothermic heats of reaction permit a substantial production of 150-lb. steam, which is used for the turbine driving the centrifugal blower, for the sulfur pump and for other services, making the plant self-sufficient to the point where it requires no outside fuel other than for starting.

The plant's waste heat boiler consists of a Scotch Marine-type boiler with an external combustion chamber and burner attached directly to the firing tunnel. The burner is especially designed to handle the acid gas, with close control being provided for the air used in combustion.

Converters have a refractory lining for protection of the steel shell. The lower part of the chamber is fitted with supports for the catalyst bed. Condensers are shell and tube type units.

Auxiliary burners are used for reheating the process gas stream, and are similar to the initial combustion chamber but smaller. The incinerator is a circular brick-lined combustion chamber through which the waste gases from the sulfur plant are passed. They are heated to a high temperature by a natural gas burner, to permit the conversion of the small remaining amounts of hydrogen sulfide to sulfur dioxide. The hot gases leaving the incinerator pass to the stack for disposal to the atmosphere.

The air blower that furnishes all of the combustion air for the process on the latest installation is an unusual unit. The blower was manufactured under special order by the Air Appliance Division of the United States

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for local dealers?*



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Pacific Telephone

Hoffman Machinery Corporation. In contrast to previously designed blowers which have either been driven by steam turbine or electric motor, this centrifugal blower is directly connected to two drivers, a turbine on one end and a motor on the other.

Dual power control is provided in order to be prepared for the possible emergency which could occur in a power failure. Controls are so installed as to automatically transfer the load to the steam turbine as a driver the instant the power supply to the motor is shut off. Normally the motor is used, with the turbine idling.

Sulfur transfer

The plant's sulfur transfer pump is a vertically submerged bowl centrifugal with a steam turbine driver. It is used for transferring sulfur from the liquid sulfur pit, and is controlled manually. The tank where the sulfur is collected and stored in liquid state is built below ground level and has a capacity of 100 tons. It is equipped with steam coils to keep the sulfur in its liquid state.

Reactions that produce sulfur start in the combustion chamber, and a substantial amount of production is condensed in and removed from the waste heat boiler. The gases leaving the boiler pass through the first catalytic converter, where the reaction proceeds further, and then into a condenser, where the sulfur is condensed and separated from the gas steam.

After leaving the condenser, the process stream is reheated by mixing with combustion gases from an auxiliary burner in which some additional gas is burned with air. The reheated system then goes to a second converter, where the reaction is carried still further and more sulfur is produced. Leaving the second reactor, the gas is passed through another condenser, where additional production is separated.

Sulfur dioxide

Waste gases from the second condenser pass through a scrubbing tower and then go to an incinerator, where the small remaining amount of hydrogen sulfide and sulfur vapor is burned to sulfur dioxide before the waste gases are discharged into the stack.

The sulfur produced in this process is withdrawn from various points as it is condensed, coming from the waste heat boiler, the converters, the sulfur condensers and the scrubber. It is all collected into a single concrete sulfur storage tank located below ground level, from which it is pumped to trucks or tank cars for shipment in the liquid state.

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REDUCE VIBRATION with wool felt

WOOL FELT is an excellent medium for isolating machine vibration transmitted to the surrounding plant areas and causing wear and tear on men and machines.

When the proper load-per-unit-area felt pad thickness and type are used, high isolation efficiency is obtained without encountering difficulties caused by other materials, says the Felt Association. The most effective way to overcome transmission of vibration is to mount power-driven machinery on vibration absorbing material. Through the years a wide range of material has been used for this purpose, including wood, paper, rubber, cork, springs and other media.

All sound is produced by mechanical vibration. Because of the nature and function of machinery, some of this cannot be eliminated but most can be controlled. Rotating or reciprocating

parts should be accurately balanced in the design stages of machine construction. Pounding shafts and rods contribute to noise because of overliberal bearing tolerances. Aside from changes in structural design, substitution of non-metallic gears for metal ones can also cut down noise and reduce maintenance costs. Over-all noise incidence in the plant can also be attacked from the standpoint of machine layout.

Machine placement

Vibrating machinery should not be mounted on structural beams capable of transmitting noise from the machinery location. Vibrating floors and high shop noise are common when shock-producing presses, shearing machines, machine tools and other items are bolted down without provision for vibration isolation.

In some cases where operating machinery has been mounted on felt, reduction in transmitted vibration is as high as 85%. Although vibration problems vary greatly, the loading of the average production machine usually falls within a range of 10 to 100 psi. Research has established that around 80% of industry's vibration problems fall within the medium load range of 10 to 50 psi.

For most installations a 1/2 in. to 1 in. thickness of felt is generally effective. However, where extreme vibration or hard impact must be absorbed, 1 1/2 to 2 in. thicknesses are recommended. Anti-vibration felt is generally supplied by the industry in square sheets of various sizes from which small amounts of the required size can be cut. The greatest isolation efficiency is accomplished by using the smallest practical area of felt that resists its load without excessive compression.

The smallest practical area of felt for most machines is roughly equal to the base area of legs or other supporting members. For flat-bed machines an area about 1/20th of the base surface is usually recommended. Once the felt has been cut to size, felt mounts can be installed as follows:

**HERE'S HELP TO UNDERSTAND
YOUR PUMPING
PROBLEMS BETTER**

TS-3
File in Engineering and
Maintenance Section of Library

Studying the Installation
By W. E. S. BARRINGTON, Chief Field Engineer

VIKING PUMP COMPANY, Cedar Falls, Iowa

Write for
"Studying the Installation"
Bulletin TS-3 A

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KDK BODY

1. Mark position of the machine on the floor and shim if necessary.

2. Raise machine by block and tackle or other means.

3. Clean feet or base surface of machine and corresponding floor areas.

4. If shims are required, cement them to the floor.

5. Apply coating of adhesive, using pressure to force adhesive into the pad and also into the floor if the latter has a rough surface. Place pad in position with firm twisting motion to break any skin which may have formed. If a double thickness of felt is needed, cement one pad on top of another.

6. Apply coating of adhesive to top surfaces of mounts. Lower the machine and allow it to set for at least eight hours, preferably overnight before use.

Most felt companies sell felts suitable for all general vibration and noise problems. If there is doubt as to whether general or heavy-duty felt is required, the problem should be brought to the attention of the felt manufacturer. In doing so, the following data should be supplied:

1. Type of machine with maker's name, model number and serial number.

2. Composition of floor on which machine is mounted.

PERSONNEL Management Association meets

THE PACIFIC NORTHWEST Personnel Management Association met in Seattle recently to discuss sound personnel fundamentals. Harry Stevens, president of Vancouver Holdings, Ltd., indicated that the personnel administrator is fundamentally responsible for serving in a liaison capacity between management, labor and the investor. This is a far cry from the early concept of personnel as a welfare or charitable activity. Profit sharing was described as a possible solution to the present danger of inertia and falling production levels.

Another speaker, Joseph M. Trickett, pointed out that the majority of workers are now high school graduates and this necessitates a change of attitude on the part of old style management. Greater emphasis on the individual must replace our concern with "thing-type" management.

One of the most stimulating features of the meeting was "What's new in my company," presented by six members, covering such things as reducing absenteeism through foreman action, and foreman-centered safety programs.

STEEL WAREHOUSEMEN



LEFT, Walter S. Doxsey, president of American Steel Warehouse Association; on the right, J. V. Honeycutt, assistant vice president of Bethlehem Steel Co.

SPEAKING at a meeting of the Southern California Chapter of the American Steel Warehouse Association

in Los Angeles, Mr. J. V. Honeycutt, assistant vice president of Bethlehem Steel Co., said, "Construction, which represents an estimated 35% of steel consumption on the Pacific Coast, accounts for only approximately 20% in the nation as a whole. On the other hand, manufacturing activities, accounting for two-thirds of the national steel consumption, account for only approximately 40% of the Pacific Coast steel consumption.

"As population continues to grow, and the Pacific Coast develops further, it would be expected that the proportion of steel consumed in manufacturing industries would tend to increase to a point closer to the national level."

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- 4. IT MUST ABSORB SHOCK—NOT TRANSMIT SHOCK TO THE PRODUCT.
- 5. ITS LIGHT WEIGHT MUST REDUCE TARE WEIGHT, REDUCE FREIGHT BILLS.

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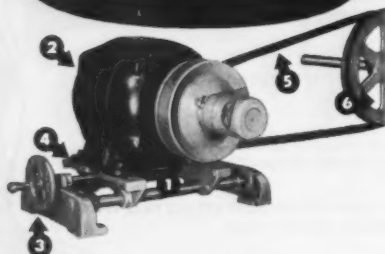
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**A Western meat packer saves
2 1/2 hours of rendering time daily**

PORK FAT at the Coast Packing Co., Los Angeles, was previously loaded into carts and trucked to the third floor for rendering. Now, with the installation of a pump and grinder set, fat passes off the trimming table into the grinder and is pumped directly to the rendering kettles with a resultant saving of time, space and labor.

Through the use of a Viking pump and grinder set a saving of 2 1/2 hours in rendering time is effected. This has increased rendering capacity. The fat is very well homogenized by the time it passes through the pump and grinder and comes out a much better grade of rendered lard than that previously produced.

The layout

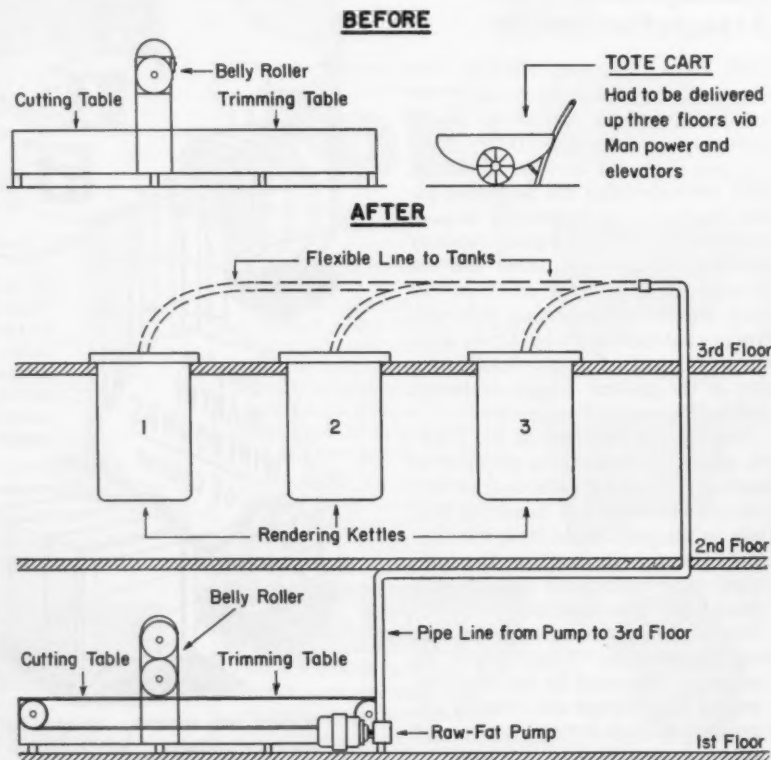
The pump is located in the cutting room, mounted directly under the end of the cutting table. The raw fat is carried to the pump and grinder set

via an endless belt. The heavy duty pump is mounted on a base and directly connected through a flexible coupling to a 10-hp. electric motor. The pump speed is 100 rpm.

The present day kill runs between 800 and 1,000 head, giving an average cut per hour of 125 to 150 head. An average of 35 lb. of fat is cut from each hog, which means the pump handles around 35,000 lb. per day.

With the use of the pump set, the cutting room has been cleared of the many fat trucks, giving much needed floor space. Also saved are the labor costs of the two men who formerly handled the trucking. In addition, three hours per day of elevator time is saved.

The installation was handled by the Viking Pump Co., with the cooperation of Mr. Al Grundmann, plant manager; Mr. George Smith, superintendent; and Mr. Ted Barrett, plant engineer.





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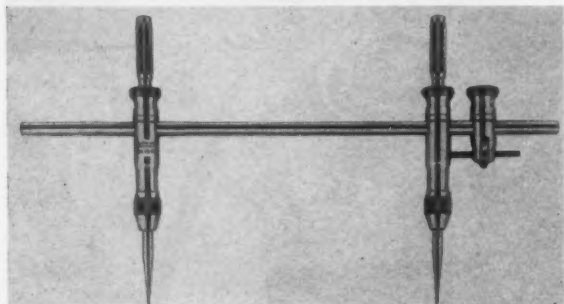


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NEW MATERIALS & EQUIPMENT

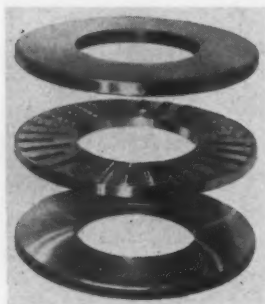
USE RIP-OUT POSTCARD for more information on products introduced this month.

1 Steel beam trammels that are easier to use



No. 180 series of steel beam trammels are designed and manufactured in every way to produce an accurate and easy-to-use tool for layout work, scribing, and measuring. Free-turning knurled grips on top of each tram make tool convenient to use. Trams will not turn once set. Scriber points are hardened for longer wear. Fine thread adjusting screw gives accurate and fine adjustment of points. *For descriptive literature and price information, circle key number on rip-out postcard.* The Lufkin Rule Co.

2 These bearings raise load capacity



Modifications in a high-capacity thrust bearing (T-59), for heavy duty applications on extruders, generators and pulverizers, are said to raise bearings load capacity by approximately 9% and its life by about 29%. These increases are due to a system of staggered slotting which increases number of rollers exposed to bearing's thrust load and thus greatly increases load capacity. Bearing will carry a 590,000-lb. load at 100 rpm. *For further information, circle key number on rip-out postcard.* Rollway Bearing Co., Inc.

3 Concerning a compact stainless steel valve

Now available is a new stainless steel valve designed especially to meet rigid appearance and service require-

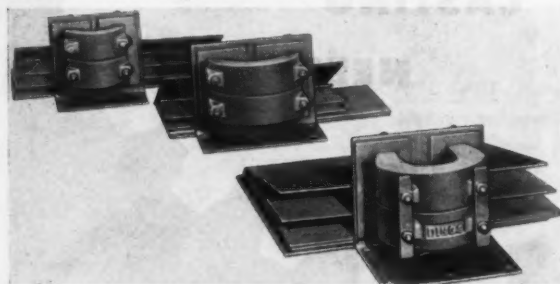
ments of food, chemical and related industries. Featuring a rugged, compact shell cast body and guided precision cast V2B disc, this union bonnet, inside screw, nonrising stem valve is available in 1/2, 3/4 and 1-in. sizes. *For complete details, circle key number on rip-out postcard.* The Cooper Alloy Foundry Co.

4 Quick-detachable swivel air connection slashes pressure drop



A new, compact, quick detachable air connection, providing almost complete free flow of air to air-powered tools, is recommended, by manufacturer, for use on paint spray guns and other air-operated equipment. It is said to slash pressure drop at connection to only 5%. An added advantage of Q-D connection is full 360-deg. swivel action. Complete information and prices are included in bulletin Q-D. *For your copy, circle key number on rip-out postcard.* Binks Manufacturing Co.

5 Sheet floater separates stacked steel sheets



For easier handling of steel sheets, consider a magnetic sheet floater. Units operate on principle that like magnetic poles repel. Sheets placed next to one, or between two sheet floaters, assume polarity of magnet poles, repel one another, and fan out. New series of Dings sheet floaters are available in three basic magnetic strengths and four standard heights capable of handling 28 through 10 gauge blanks up to 30 x 20 in. *For complete information, circle key number on rip-out postcard.* Dings Magnetic Separator Co.

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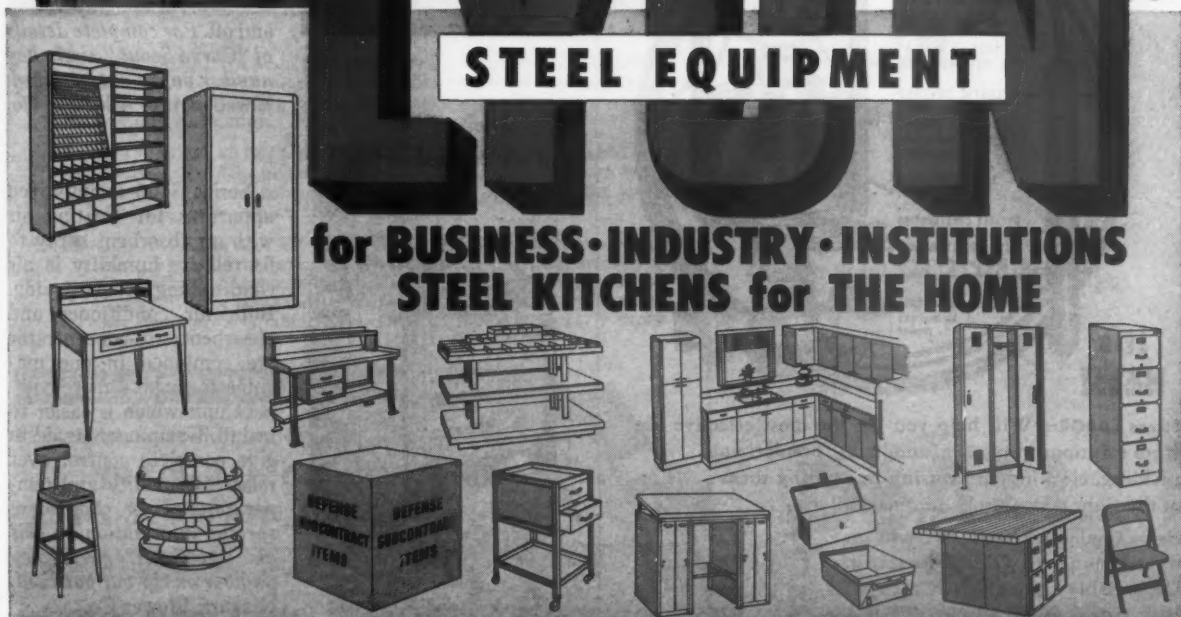
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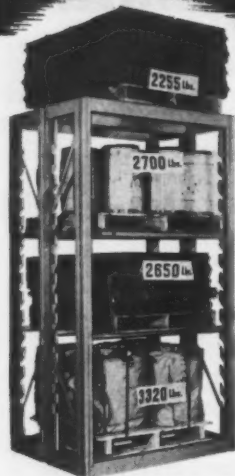
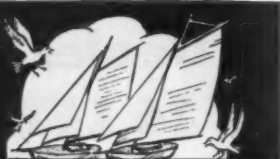
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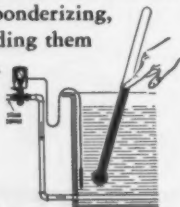
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Fluid-tight connection with manifold applications



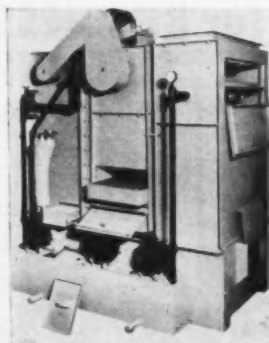
A dry differential manifold joint and a quick method of assembly are both results of an invention by George Hammon. It may be used for joining a nipple to a pipe, to an elbow, or to a valve housing and is said to solve problem of securing a leak-tight joint without use of silver solder, brazing, litharge and glycerine, or other sealing compounds. *For additional information on this product, circle key number on rip-out postcard.* National Welding Equipment Co.

Heavy weight M-H capacity for narrow aisles



"Cargo Scout" is a new electric-powered 200-lb. capacity fork truck designed for fast operation in congested areas. Truck is designed for freight car and highway truck loading and unloading, and for operation in narrow aisles or on small elevators. It is claimed particularly well-suited for truck terminal transfer and loading. Features include end control for speed and convenience of operators who must frequently get on and off. *For complete details of "Cargo Scout," circle key number on rip-out postcard.* Elwell-Parker Electric Co.

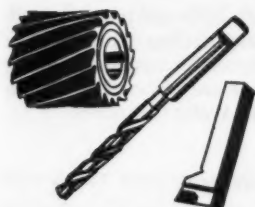
An air refresher



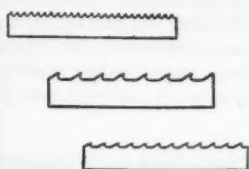
Series 5700 is improved apparatus for treating air with an absorbent spray to fix relative humidity in air conditioning or air drying. Both air conditioner and absorbent re-concentrator are combined in one machine to make a more compact unit which is easier to install. Equipment is said to give complete control over relative humidity and temperature of air. *For more specific information on this air apparatus, circle key number on rip-out postcard.* Niagara Blower Co.

Drop forged chain is easy to clean

Duraflex is a 2½-in. pitch drop forged conveyor chain with an ultimate strength of 37,500 lbs. It is flexible in four directions, has no riveted pins, and can be put together



CUTTING TOOLS



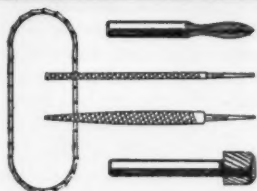
SAW BANDS



GAGES



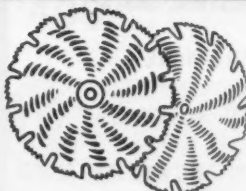
TOOL STEEL



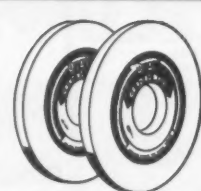
FILES



HACK SAW BLADES



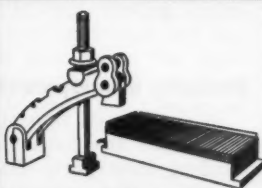
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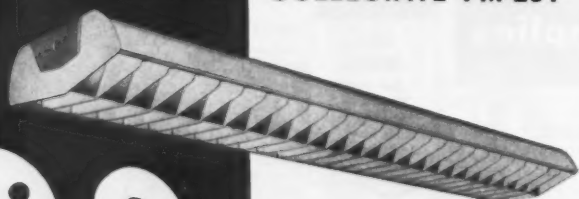
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or taken apart without tools. Both links and pins are easily cleaned—an advantage in dairies, bottling plants, or food industry where this chain is especially adaptable. For a bulletin presenting more facts on Duraflex, circle key number on rip-out postcard. Jervis B. Webb Co.

10

Unlimited hole punching patterns



Wales patented multiple hole punching system comes with punch retainer plates for unlimited patterns. System provides a simple, fast, convenient and economical method of punching holes in sheet metal parts by permitting entire setup to be made outside stamping press or press brake. Assemblies and dies are interchangeable. For complete information, circle key number on rip-out postcard. Wales-Strippit Corp.

11

Brushing developments eliminate hand work

Osborn's newly developed power brushing methods are said to take time-consuming hand work out of burring and finishing large parts. Natural for removing burrs and blending surface junctures and other finishing jobs of large or heavy work pieces, methods are important in time saving

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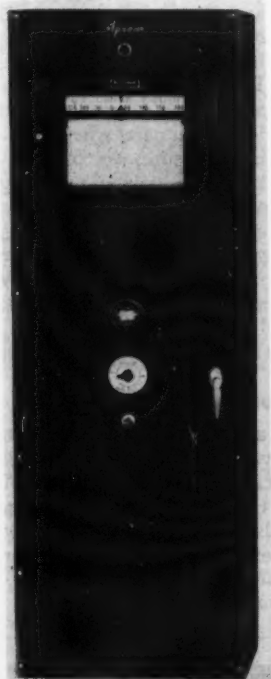
STANDARD
HORSE NAIL CORP.
NEW BRIGHTON, PA.

Western Factory Sales Representatives
GREYER & GREYER, P. O. Box 47, Stockton, California

and in fine quality of finished work. Operation of brushing machines is claimed to be simple enough for an unskilled operator to learn easily and quickly. *Circle key number on rip-out postcard for more information on this improved way of finishing.* Osborn Manufacturing Co.

12

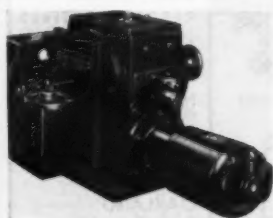
Dew-point controller for heat-treating furnaces



An automatic, self-contained unit, which operates electronically, continuously records and controls furnace dew point in controlled atmosphere metal treating furnaces. Instrument makes possible completely automatic heat treating cycles such as carburizing and carbon restoration. *For more information and specifications, circle key number on rip-out postcard.* Ipsen Industries, Inc.

13

Constant air-weight control for cupola blowers



Dyna-Jet is a new control system for use where power input is a convenient measure of other variables. Originally designed for constant air-weight control of motor-driven cupola blowers, system has other applications, such as control of mixers, grinders or polishers. It is equipped with a special power-responsive signal system. Bulletin 158 describes control unit and gives complete specifications. *For your free copy, circle key number on rip-out postcard.* Askania Regulator Co.

14

Top operation and fire resistance combined in hydraulic fluid

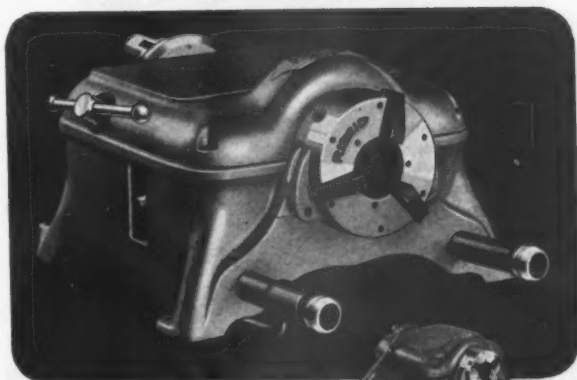
"Houghto-Safe" is said to satisfy need for a safe, non-toxic, non-corrosive liquid than can be used in hydraulic equipment operated near open flames or extreme heat conditions. A water-base, "snuffer type" material, it is rated as an "acceptable hydraulic fluid from the fire hazard standpoint" by Factory Mutual Engineering division of Associated Mutual Fire Insurance Companies. *For more information on this fluid, circle key number on rip-out postcard.* E. F. Houghton & Co.

Push-button Muscle

The tough little brute of a work-saver when you've got pipe to thread, cut or ream

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"400" Portable POWER DRIVE



On your bench!

Portable Stand



It's light weight!

● The last word in easily portable power to turn your pipe for threading, cutting, reaming with your hand tools—quickly pays back its cost in saved time and work. Capacity $\frac{1}{8}$ " to 2" but scads of power even for geared tools to 12". **RIGID** design 3-jaw chuck, 6 pinions, one always handy. Self-centering workholder in rear. Sealed-in lubrication—no oil to spill. Famous **RIGID** "guts" in it—scores of thousands in use. Try it, buy it—at your Supply House.

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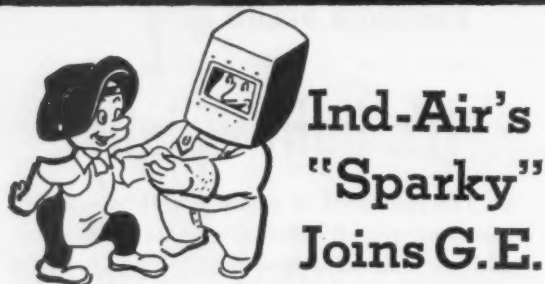


A complete, comprehensive handbook on cold-headed nails, rivets, screws and other special fasteners. Check on ways to improve your assembly cost-wise, appearance-wise and from a standpoint of maximum effectiveness at minimum cost. One hundred years of experience are at your service. Write for price quotations.

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Ind-Air's "Sparky" Joins G.E.

Good news for all users of welding supplies and equipment! Industrial Air Products Co. now, in addition to its many leading lines of welding equipment, has been appointed distributor by General Electric for their welding machines and electrodes.

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A dry lubricant with high film strength



Drylube is said to provide answer to difficult lubricant and anti-sizing problems. High film strength, low coefficient of friction, extreme tenacity, chemical and thermal stability, and corrosion resistance make it particularly adaptable. Drylube coating processes are claimed especially suited for use on parts where bearing pressures or temperatures are beyond capacity of conventional lubricants, and where danger of scoring, galling or sizing exists. *For free literature circle key number on rip-out postcard.* Drylube Co.

Cushion tires for Towmotors

Towmotor Corp. now offers a choice of solid or cushion tires as original equipment. Available at extra cost on all of firm's units, cushion tires can be furnished in any of four nationally-known makes. Generally longer-lived than solid tires, pneumatic type also provides greater riding comfort for operator and assures smoother truck or tractor operation. *For specification bulletin, No. DF-2 Rev. 1, encircle key number on rip-out postcard.* Towmotor Corp.

Call Nutting For TRUCKS WHEELS CASTERS

FIG. 1002
Heavy duty bar handle platform truck

FIG. 1001-X
"Auto-Load" Barrel Truck

FIG. 1001
Balance-type platform stake truck

FIG. 1101 DPL
Light weight 2-wheel utility truck

FIG. 11
Western Pattern with Steam Bent Handles

FIG. 215
Golden Gate Pattern

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Chapman & Stickler, Ltd., 755 Sheridan St., P.O. Box 2822

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H. L. Stewart & Associates, 1547 Estudillo Ave.

OAKLAND
Roll-Rite Corporation, 801 Jefferson St.

TUCSON
L. J. Clarke and Co., 426 East 7th Street

PORTLAND
F. E. Bennett Co., 426 N. W. 6th Ave.

SALT LAKE CITY
Equipment Supply Co., 16 Post Office Place

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Seward Sales Company, 95 Connecticut St.

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SCHEEL INTERNATIONAL, INC., 4237 North Lincoln Ave., Chicago 18, Illinois

Since 1891 **NUTTING TRUCK AND CASTER COMPANY**
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17

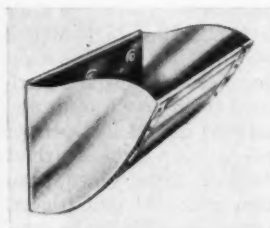
Scales—from light to heavy duty



A full range of models from bench scales to heavy duty motor truck scales feature one piece sectors in new full floating, double pendulum mechanism. This construction is claimed to increase precision and strength and to eliminate hand adjustments necessary in older assembly of several components. Indicating heads of these new Toledos can be installed to face in one of eight directions, or a scale can be ordered with a head to swivel fully through 360 deg. Form 2001 is a condensed catalog of these new scales. *For your copy, circle key number on rip-out postcard.* Toledo Scale Co.

18

Elevator buckets on the rebound



Manufacture is resumed on "Hi-Cap" line of high speed elevator buckets suitable for handling any powdered or granular free flowing material which is not excessively abrasive. They are said to perform with equal efficiency at high, medium, or low speeds and may be used for replacement purposes or for new installations in chain or belt elevators. Made from heavy gauge cold-rolled steel, durability of these buckets is assured by a rolled front lip of double thickness. *Circle key number on rip-out postcard for more details on this equipment.* Fort Worth Steel & Machinery Co.

SULPHURIC ACID

for the west

66° BAUME

20%

98%

OLEUM

and special grades

Garfield

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700 PACIFIC NAT'L BLDG.
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PENFLEX

HEART OF INDUSTRY'S LIFE LINES
LOS ANGELES: 3414 EMERY STREET

19

Roller top trailer a natural for pick-up and transfer



Type A-308-78M is a 3,000-lb. capacity trailer featuring two roller conveyor sections at a height of 30 in. from floor. It was designed to fit into standard conveyor lines to permit pick-up and transfer of packaged units. In operation, cartons or cases coming down conveyor line automatically load themselves onto trailer by riding over rollers. *For more information, circle key number on rip-out postcard.* Mercury Manufacturing Co.

20

No jigs or fixtures needed for welding



Aircospot Gun makes instantaneous welds on stainless, mild, and alloy steels without aid of jigs or fixtures. Unit consists of a hand gun, control panel and all necessary hose and cable assemblies. Light-weight spot welding gun uses a 3/8-in. non-consumable thoriated tungsten electrode and an inert-gas shield. Operator needs only position top sheet on piece to be joined, position gun, and pull trigger. Operation is said to be completed in about one second. *For a leaflet listing all technical data, circle key number on rip-out postcard.* Air Reduction Pacific Co.

21

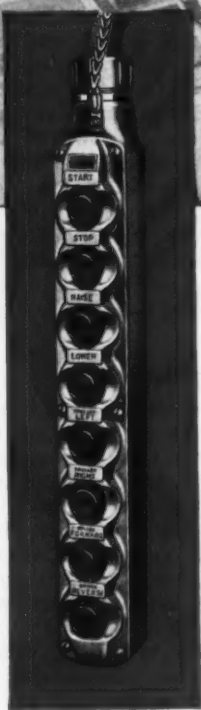
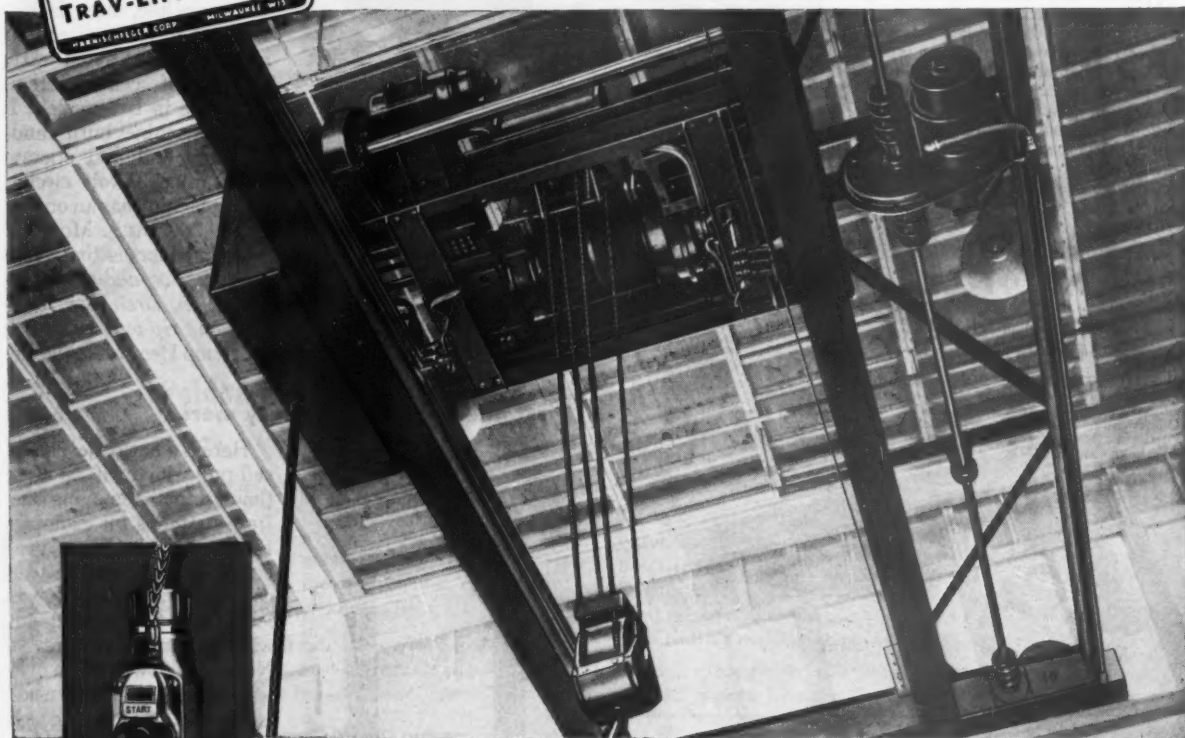
Low cost comparator high in versatility



"Producto-Chek" is a bright new hope for assembly line checking. This light-weight mechanical comparator features high accuracy and wide versatility at low cost, making it economically possible to apply method to assembly line checking operations. Size settings are made rapidly because of three adjustments. Gauging head features a "double reed" system that obviates use of gear trains, levers, racks, and pinions. *For additional information, circle key number on rip-out postcard.* The DoAll Co.



What do You have to handle?



• Whatever it is, make the job easier and faster with the P&H Trav-Lift Cranes. Serve an entire bay with "thru-the-air" handling over congested floors. No out-of-reach spots! No rehandling. One man lifts, transports, and stores loads up to 15 tons by pressing buttons.

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The P&H Trav-Lift is built to meet a variety of needs . . . with either cage or floor control . . . with suitable spans and lifting speeds . . . in capacities up to 15 tons. Call P&H for expert assistance with your handling problems. Write for booklet H-13-1.



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P&H Trav-Lift Cranes are made in the West, for the West. When parts or service are needed, remember, we're neighbors. Drop in and see our new Pacific Division headquarters — the West's most modern crane factory. You'll get fast, experienced help with your problems.

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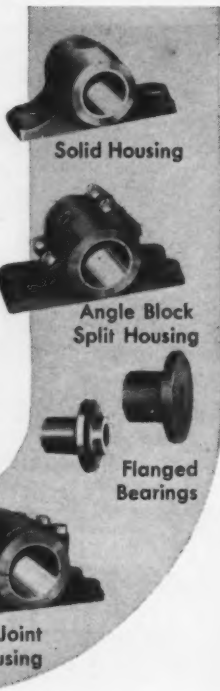
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NEXT time you need babbitted or bronze bearing blocks, get in touch with Link-Belt. Here's a single source for a complete range of types and sizes. Babbitted blocks are built in split or solid housings for oil, grease or ring-oiling lubrication. Where conditions are more severe, Link-Belt offers a companion line of bronze blocks. Ask your Link-Belt sales representative or distributor or write for Folder 2387.

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Screw-Lift

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*Does many chores...
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Screw-Lift is a dust-tight, totally enclosed, moisture-proof, sanitary, tubular conveyor that handles any free-flowing bulk material... conveying any distance horizontally and to any practical height to suit individual conditions.

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Our full scale pilot plant will demonstrate Screw-Lift efficiency with your own material. Send sample or write for Form M-500-2



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PRODUCTS MANUFACTURING CO. INC. - CHICAGO, ILL.

"Heat on Wheels"



Here is a portable heating unit designed for industrial use. By a patented "counter-flo" principle, heat is distributed in three directions at floor level to avoid waste heating of ceiling areas. Available in two models, L and H, machines burn standard stove oil and operate from any 110-volt circuit. Each machine has an output of 189,000 Btu's. Model H is designed for venting where desired. *For additional information, circle key number on rip-out postcard.* Mortemp Heat Machine Co.

First aid for storage battery users



Here is a newly developed cell-pull which will be more than useful in removing cells from batteries for examination or repair. Tool, generally used in sets of two, consists of a U-shaped steel loop brazed to a steel nut with specially-cut threads. Nuts are screwed down over lead posts, a piece of wood is placed in loops, and cell is pulled from battery by a chain or rope. *For more details, circle key number on rip-out postcard.* Gould-National Batteries, Inc.

Inventory time reduced electronically



"Speed Tally" is a new electronic device said to reduce, to a fraction of a second, time needed to check an entire inventory. This mathematical wizard is said to receive tallies of orders, or inventory items, through its keyboards, and within 4/10 of a second add new item to existing total, in proper classification, and register new total. *For more complete details, circle key number on rip-out postcard.* Remington Rand Inc.

Proof for planned group relamping

Thanks to a new demonstration tool, lighting men are now able to prove graphically that planned group relamping "pays big dividends." Device, called "G-E Lamp Burn-out Visualizer," resembles a punch board and operates like a slide rule. It exposes hidden costs of spot relamping. It is designed especially for demonstration to managers of factories, stores and offices. *Circle key number on rip-out postcard for additional details.* General Electric Co.

Round MEANS CHAIN

**Welded and Weldless Chain, Chain Assemblies,
Slings and Fittings for Every Purpose**

Before coming to America 84 years ago, the *Round* Family had been one of England's leading chain-making families for nearly 200 years. The name *Round* was on every piece of chain they built—and was a name that meant the *finest* chain.

In America, the Rounds continued to build chain in their same craftsman way. Soon the name *Round* became the standard for

quality chain in *this* country.

In those early days, chain was built by hand. Now, most types are built by automatic machines. Though the present *Round* Organization has changed to new, modern methods of making chain, the *Round* policy of building quality chain has not changed.

Today, throughout the world, the name *Round* means Chain . . . the *finest* chain.



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Weldless
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Best and the Most
wrench service for your money

The reason **RIGID** Heavy-Duty Pipe Wrenches are known for the brutal punishment they can take is because of the toughness built into them, checked part by part and then hard work-tested when assembled...not just one wrench in 100 or 1000 but *every last one!*... Add the guaranteed repair-free housing, no-slip no-lock jaws, handy pipe scale, easy spinning adjustment nut and comfort-grip I-beam handle and you see why genuine **RIGID** gives you the big value for your money. Buy them at your Supply House.

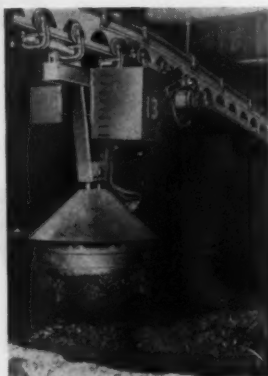
THE RIDGE TOOL CO. • ELYRIA, OHIO



26

Magnet carrier gathers scrap automatically

Here is an efficient, low-cost method of ferrous scrap disposal, an automatic magnet-carrying system that picks up and moves one carload of metal chips and shavings daily without attendants. System's two carriers operate independently of each other, are equipped with 36-in. diameter magnets, and make a round trip in approximately three minutes. Manufacturer is prepared to design other types of equipment for handling non-ferrous metals. *For further information on systems and services, circle key number on rip-out postcard.* The Cleveland Crane & Engineering Co.



27

For handling small parts efficiently

Increased efficiency in handling of very small parts is promised by a new and smaller NesTier. Made of 20 gauge steel, green enameled NesTier is claimed capable of handling 200 lb. with standard handle and 400 lb. with heavy duty handle. It weighs three lb., and has a 238-cu. in. volume. It measures 12 x 7 1/4 x 4 3/4 in. Units nest and tier by flipping handles at both ends. *For more information, circle key number on rip-out postcard.* Charles William Doepke Mfg. Co.



28

Air tools feature reversible motors

A series of 24 light-weight, air-operated, reversible screw drivers and nut setters can be used for removing threaded fasteners as well as applying them. Featuring reversible motors to permit this operational twist, these latest additions to Thor No. 2 line of air tools also speed up inspection, testing, service and repair of all assembled products. Units are available in four basic speeds. *For specification information, circle key number on rip-out postcard, and send it to us.* Thor Power Tool Co.

29

Automatic welder is versatile and simple

New unit, designed to speed up production and improve quality of welds on large structural parts, is a fully automatic submerged melt welding machine incorporating a standard welding head from an older type machine. Base and track assembly is adjustable for fast alignment with work. Track sections may be added for welding longer work pieces. Machine is said to multiply, approximately four times, volume of work that can be done by a man with a manual welding arc. *For further information, circle key number on rip-out postcard.* The National Supply Co.



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NEW MATERIALS AND EQUIPMENT IN BRIEF

30

Grey granite surface plates for economy

Microflat presents a new line of grey granite surface plates with costs ranging to 21% less than plates made of black granite, although same accuracies prevail. Sizes range from 12 x 18 in. to 48 x 72 in. in two- and four-clamp edge types. *For new literature on this line, circle key number on rip-out postcard.* Collins Microflat Co.

31

Indicator judges crane weight and radius

A new principle of operation is said to make Type SB-10 Martin-Decker crane indicator easy to install, more accurate and dependable. A simple dual hydraulic system, employing a direct load pressure transformer, makes it possible to incorporate three lifting, measuring factors into one gauge: lifting capacity, boom radius, and total load weight. *For complete information, circle key number on rip-out postcard.* Martin-Decker Corp.

32

Quick preheating with new metal working electrode

"ThermoTrobe" is a new product developed for 1,001 places where use of an acetylene torch is impractical or impossible. Rather than for welding, it is designed as a new source of instant heat wherever and whenever needed. No special equipment is required. After ThermoTrobe is inserted in an ordinary electrode holder of a DC arc welder, it is claimed to be all set for work. *For more information, circle key number on rip-out postcard.* Eutectic Welding Alloys Corp.

33

Polishing characteristics combined in new abrasive belt

"Three-M-ite" Multicut cloth belt combines polishing characteristics of hand-coated glue and grain set-up wheels and belts. It is said to offer all advantages of a coated abrasive belt manufactured under controlled factory conditions. Originated to replace set-up wheels and belts, it is expected to find wide use in manufacture of hand tools, cutlery and surgical instruments. *For additional information, circle key number on rip-out postcard.* Minnesota Mining and Manufacturing Co.

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34

Cut-off wheel features longer life

An improved, reinforced, resinoid, hub-type cut-off wheel, known as BFR wheel, replaces one with same designation which has been on market. New wheel's main feature is longer life. Tests are said to show that increased life of up to a third more than former wheel can be expected with same quality of cut. *For detailed information, circle key number on rip-out postcard.* Norton Co.

35

Wet Jet for dustless sandblasting

Wet Jet is a compact, self-contained unit claimed adaptable to any sandblast hose. It gets its water supply from any source including ordinary faucets. Now, for cost of this inexpensive nozzle and simple length of hose connecting it to water source, you can have quick, dustless sandblasting. *For more detailed information circle key number on rip-out postcard.* Sanstorm Manufacturing Co.

36

For easy movement of highway trailers by rail

A newly developed attachment now enables a standard heavy-duty fork lift truck to position a highway trailer on a railroad flatcar in a matter of minutes. Attachment is designed for use with standard 26,000-lb. capacity Ross fork-lift truck. *For more particulars, circle key number on rip-out postcard.* Clark Equipment Co.

37

Magnetic sweeper for cleaner, safer roadways

Super-Sweeper is a highly versatile and efficient magnetic cleaner that will take care of nails, spikes, tacks and other jagged iron pieces on roadways, factory floors—pieces which cause millions of dollars' damage yearly in tire blowouts, falls, and other accidents. *For additional information, circle key number on rip-out postcard.* Eriez Manufacturing Co.

38

New hose is hard to damage

Condor acid discharge and Condor acid suction hose has been made resistant to a wider range of acids, salts, alkalis and other solutions. Improvement has come by compounding a new synthetic with other acid-resisting materials for tube and cover. Tube is also claimed highly abrasive resistant to withstand slurries. *Circle key number on rip-out postcard for more details.* Raybestos-Manhattan, Inc.

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D

Land, labor and location in Marysville and Yuba County

Here is get-acquainted data to give your company a basic background to better judge why this area is a good place to establish an industrial plant. Booklet's Land section includes map, information on marketing, transportation, soil and rainfall, climate, natural resources, areas of county, and agriculture and farm development. Part two, Labor, covers labor analysis, industrial employment, purchasing power and population. Location info. takes in sites, geography, power-fuel-water, business trends, trades and services, housing and civic and social advantages. *Industrial Commission, Marysville-Yuba County Chamber of Commerce.*

40

Automatic deburring with the push of a button

A folder, from *The Osborn Manufacturing Co.*, promises simplification of your operations with consequent cutting of production costs by use of firm's power brushing method. Case histories are cited with explanations of work said to be characteristic of this machinery. On final page, company offers you an OBA (Osborn Brushing Analyst) for a survey of your deburring needs.

41

Revised guide to Vari-Speed Motodrives

This 46-page catalog is designed to give you a complete story on *Reeves Pulley Co.'s* Vari-Speeds. Contents include: how to order; prices and hp. ratings, prices of modifications, controls, and indicators; dimensions and assemblies, dimensions of controls; and engineering information. Publication is three-hole punched for handy carrying. Illustrative pictures and diagrams appear throughout. M-521

42

Fresno and Western industry

Here is a collection of informational material on Fresno, Calif. *Fresno Industrial Site Development Foundation* offers a brochure entitled, "Fresno offers Industrial Sites." "Agricultural Production and Farm Income" is pub-

lished by *Fresno County and City Chamber of Commerce* which will also supply you with material on Fresno County trade area. Folders and a cartoon map present details of living in this area.

43

On steel lockers, shelving, and shop equipment

Here, in one condensed buying guide, are latest ideas in quality, steel storage space, cartage, and work areas. Catalog includes specification data with pictures and technical information on these products. *Republic Steel Corp.*

Circle key number on rip-out card for literature you want

44

All about rocker arm spot welders

Here they are—rocker arm spot welders that are foot operated, air operated, and air solenoid valve operated. Bulletin giving features, specifications and pictures explains why manufacturer lays claim to greater production speeds, better welding consistency, less operator fatigue, and more efficient spot welding operation. *A. P. Seedorff & Co., Inc.* 530

45

The answer to difficult lubricant problems

A brochure from *Drilube Co.* will tell you facts about this company, its product, and about Drilube process. A few of this lubricant's uses are listed. Product tests are given in full accompanied by schematic diagram and test equipment set-up. Test data, summary and conclusions prove most convincing.

46

The goods on hand pushed trolleys

Literature describing Webb hand pushed trolleys and accessories for various load capacities and uses is offered by *Jervis B. Webb Co.* of California. This 16-page bulletin gives complete dimensions, diagrams and engineering data on single and double hand pushed trolleys for various sizes of I-beam. Also included are hand pushed bridge cranes and "Y" stub, two-way and three-way switches, both rolling and sliding type. 453

47

"Faultless" guide to materials handling problems

Selection tables, recommendations of correct type casters for specific equipment, what wheel constructions are best under certain circumstances, and related engineering data are clearly presented in a new guide from *Faultless Caster Corp.* In addition, you will find descriptions, illustrations and specifications on company's line of double ball bearing swivel and rigid casters. All in all, there are 80 complete pages of data to help solve your materials handling problems. 157

48

For better floors

How to meet tile floor problems, information on preserving wood and concrete floors, and pointers on modern maintenance of floors—all are covered in brochure, folder and sheet form by *A. C. Horn Co., Inc.* Get your copies of these valuable publications by circling key number on rip-out postcard.

49

Milling cutter folder

Hi-Helix contour milling cutter is presented in a folder from *Douglas Tool Co.* Advantages, applications, and improvements are mentioned plus

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MTU-64

a suggested drawing of typical cutter utilizing Hi-Helix construction. Available sizes are listed on back of folder. 6

50

Unitizing and Materials Handling

Signode Steel Strapping Co. presents an accordion folder on "unitizing," a newly coined word describing function of unit bundling, and six basic ways in which to do it. Reading this publication should give those responsible for materials handling a clear understanding of unit bundling and how Signode strapping techniques will help. Booklet's reverse side shows four basic tool set-ups available as simple solutions to unitizing processes.

51

Sprocket list on special paper

Morse Chain Co. presents a new 16-page, pocket-size catalog, printed on oil and moisture resistant paper, which lists prices and specifications for firm's Taper-Lock stock roller chain sprockets. Tables include hp. ratings, Taper-Lock bushing and sprocket specifications and prices, and roller chain and part specifications and prices for ½, ⅝, ¾, 1, and 1¼-in. pitch chain. B55-53

52

Info on vibrating screens

An eight-page booklet describing Hewitt-Robins, Inc.'s new style J Vibrex vibrating screen is ready for distribution. Material covers general description, design and construction features, applications, dimensions and specifications, installation, and operation. Charts, drawings and pictures illustrate this two-color booklet. 122-J

53

Hand and electric hoisting equipment

"There's a Yale Hoist for Every Lifting Job" is a 12-page booklet, published by Yale & Towne Manufacturing Co., describing both hand and electric hoisting equipment. In it are illustrated most suitable hoists for a big job, a specialized job, an occasional job, and every job. Other illustrations show how Yale hoists save time, money, and manpower in various industries.

54

"How Another Coast Manufacturer Buys Wire" . . .

. . . is a folder from U. S. Steel Corp. giving a 1, 2, 3 rundown of how thousands of tons of tailor-made wire is

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installation
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Los Angeles

In heavy industry, where production lines depend on continuous performance of overhead cranes, those who know select Craneveyor. Time and time again, like the installation shown above, Craneveyor has been selected on past performance. Craneveyor has the facilities to meet all of your crane and hoist requirements. They have the experience and engineering skill to design the type of job that will fit your specific needs. A telephone call or a letter will bring our representative to your office.

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thoughtfully purchased. Folder includes a picture-explanation series of how a car seat is made (with wire springs, of course). An outside sheet, a check list of more than 1,000 types, grades and finishes of manufacturers' wire is also available to you.

55

Data on push button assembly

Data sheet, published by *Minneapolis-Honeywell Regulator Co.*, gives full information on IPB4 push button assembly for panel mounting. Advantages and characteristics are listed for this device. Electrical rating, variations available, installation, assembly and disassembly are all covered. Button assembly is illustrated by both diagram and photograph. 77

Circle key number on rip-out card for literature you want

56

26 pages of welding accessories

A complete guide to selection of *Westinghouse* electrodes for various metals; specifications on clamps, fittings, brushes, cables, hammers, and chippers, goggles, protective clothing, headgear, shields and lens holders; physical properties and chemical analysis, methods, joint design and application suggestions on various *Westinghouse* brazing alloys and flux are included in a series of three catalogs. Your copies may be obtained by noting above key number on rip-out postcard. B-5451, B-5454, B-6070

57

Of value to tool steel users

A booklet, published by *Bethlehem Pacific Coast Steel Corp.*, simplifies

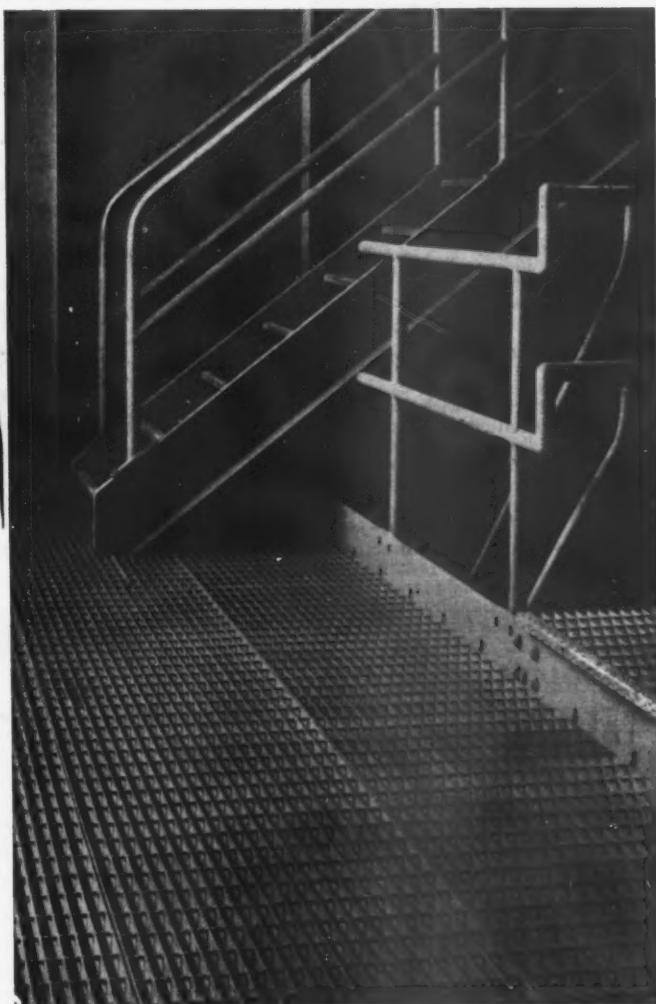
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For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

**REGARDLESS OF THE SIZE
AND TYPE OF YOUR MACHIN-
ERY, LUBRIPLATE
LUBRICANTS WILL IMPROVE
ITS OPERATION AND REDUCE
MAINTENANCE COSTS.**



selection of proper tool steel for a particular job. Basic types and applications are described under classifications of carbon and carbon-vanadium; oil and air hardening tool and die; shock resisting; high speed; hot work; special purpose tool and die; and finishing steels. Tool steel grades for varying production conditions are recommended for 246 specific types of applications. 344

58

A picture story of better built-up roofs

Here, in a folder published by *Grem's Manufacturing Co.*, is a history of roofing performance made outstanding by use of Permalume liquid foils. These foils are made in metallic copper or aluminum types, and in colors on special order. For your case history folder, circle key number on rip-out postcard. 12

59

"Mechanical Rubber Goods" . . .

. . . is a catalog of rubber products made by *The American Rubber Manufacturing Co.* for industry. Its 96 spiral-bound pages describe and show major types of belting: transmission, conveyor and elevator; industrial hose

for water, steam, air, oil and gasoline, beverages and special applications; industrial fire hose and equipment; molded goods—extruded, lathe cut, flat packing, gaskets; and hose fittings and accessories for industrial and fire hose. Tables, of standard iron pipe dimensions and common fractions of an inch in decimals and millimeters, round off book.

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card for literature you want

60

It's a traveler . . . it's a loader

The Baker-Lull Corp.'s latest brochure describes its Lull hydraulic Traveloader, said to fill any bill when it comes to acting as a fork-lift unit, transporter, yard crane, spooled cable reeler, or strip steel carrier. Its many features are detailed and pictured. Publication's center spread clearly diagrams this unit, and final page is devoted to specifications for Models T10G2 and T10D2 Traveloaders. AD-30C

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61
Before expanding, check these pallet racks

Running out of warehouse space? Hand picking to fill orders? Storing irregularly shaped or fragile commodities? Butler's answer to these problems is, "use Butler pallet racks!" A two-color folder presents firm's ideas clearly and concisely. *Butler Manufacturing Co.*

62
The technicalities of ultrasonic cleaning

The Detrex Corp. now offers a special technical folder on its new Sonic-clean process, by which metal parts are cleaned by application of ultrasonic energy. Illustrated with appropriate graphs and diagrams, folder describes, in detail, principles and methods used in process. SG 36-1

63
Reference work on new plating anodes catalog

A new eight-page, illustrated catalog, published by *American Smelting and Refining Co.*, provides full information on copper, lead, zinc, tin, tin-lead, cadmium, cadmium oxide and brass plating anodes. Data on sizes, shapes, compositions and other characteristics are included to help in ordering proper anode for any kind of job. 141

64
Steel book

Here is a beautifully done 28-page brochure which starts off with, and then backs up, this statement, "It is the purpose of this brochure that the facts presented herein will serve as a measure of the capabilities of the *Pittsburgh-Des Moines Steel Co.*" Some subjects in index are: historical notes; production facilities; elevated steel tanks; steel reservoirs, standpipes; wind tunnels. Booklet incorporates some dramatic photos. Back cover lists company's sales offices. 701

65
Air conditioning folder

Here is an attractive folder from *United States Air Conditioning Corp.* that describes and illustrates firm's various refrigeration, heating and ventilation equipment. Specifications, capacities, functions, and typical applications are given.

66
Tubular-type Speed Clips for fast attachments

Tubular-type Speed Clips are said to virtually nail assemblies together. They snap into mounting holes quick-

ly and easily by hand and are self-retaining with no special tools required. A concise specification folder will give you full details on tubular clips for long studs and for short studs and on special speed clips for rectangular studs. *Tinnerman Products, Inc.* 330

67
Expansion joint guide makes good picking

New 24-page Flexon expansion joint design guide is packed with engineering application and selection data necessary to proper solution of pipe-

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line expansion problems. Guide includes a discussion of various types of expansion joints now on market, types of available Flexon expansion joints, and types of pipeline motion solved by expansion joints. Design considerations, installation instructions, and selection data are thoroughly covered. Catalog's center



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GATES RUBBER CO. V-Belts, Sheaves, Pulleys, Variable Speed Transmissions, Hose

YALE AND TOWNE MANUFACTURING CO. Spur and Screw Geared Hoists, Midget King, Load King, and Cable King Electric Hoists

BLACK & DECKER MANUFACTURING CO. Electric Bench Grinders, Electric Drills, Sanders, Saws, Polishers, Hammers and Screw Drivers

SMITH WELDING EQUIPMENT CO. Welding Torches and Cutting Assemblies, Oxygen and Acetylene Regulators, Two-Stage Portable Acetylene Generators and Stationary Acetylene Generators, AC Arc Welders

THE CARBORUNDUM COMPANY Grinding Wheels, Grain, Coated Abrasives (Sandpaper, Belts, Cones, Discs, etc.)

FAULTLESS CASTER CORP. All types of Casters, Swivel and Stationary, Plastic, Rubber, Steel Wheels, Truck Locks

CONGRESS DRIVES DIVISION TANN CORP. Die Cast Sheaves and Pulleys

CALL
Kimball 7221

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SUPPLY COMPANY

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spread is devoted to a schematic piping layout illustrating various expansion joint applications and principles. *Flexonics Corp.* 135

68 "Norton Cut-off Wheels" . . .

. . . is a booklet that has just been completely revised by *Norton Co.* This 36-page instructive manual gives details on various types of cutting-off machines and abrasive cut-off wheels, their selection, application and proper usage. It also shows photographs of typical cutting-off operations, and various helpful tables for wheel selection and conversion of wheel speeds to fpm. values.

69 "Grinding Cemented Carbides" . . .

. . . is a 39-page booklet well illustrated with diagrams and photographs showing new techniques and abrasive products developed to obtain efficient and economical carbide tool manufacture and maintenance. Included are appraisals of advantages and limitations in using green grit and diamond grinding wheels. Wheel recommendations covering numerous grinding applications are to be found in brochure. *The Carborundum Co.*

70 "Tug Bar" enters materials handling field . . .

. . . and a portfolio, from *Western Gear Works*, serves to give it an industrial welcome. Weighing 110 lb., unit is said to move loads of over two tons easily. For your portfolio giving more specific details, pictures of "Tug Bar" in operation, and lists of plants and representatives, circle key number on rip-out postcard.

71 Laboratory spotlight

Here is a whole slew of scientific-type instruments gathered together in a 16-page brochure from *Harshaw Chemical Co.* For instance: Leitz dilatometer H. T. V., for precise, reliable thermal analysis; latest advancements

in practical industrial radiography; and precision instruments for metallographers.

72 "Taming Titanium"

. . . is an eight-page booklet, from *Mallory-Sharon Titanium Corp.*, analyzing the problem of developing good alloys for defense needs. Text was written by Lee S. Busch and Robert H. Dickinson, metallurgists of P. R. Mallory and Co. Included is a table showing physical properties of titanium in pure and alloyed states.

73 To cut equipment operating costs

Johns-Manville insulations, refractories, Transite pipe, packings and gaskets, and metal raschig rings are presented in this 8-page, two-color brochure. Detailed charts are accompanied by pictures and text to give a clear product picture. Sales offices are listed. 1P-28A

Circle key number on rip-out card for literature you want

74 New motor control center

Pre-engineered . . . factory wired and assembled . . . using standard components and accessories, this carefully designed and manufactured motor control center provides a simplified method of installing and servicing AC combination motor starters, lighting panels, and associated control equipment for a group of motors in a central location. Application pictures tell GE's story. Charts and diagrams illustrate it. *General Electric Co.* CR 7092

75 Fasten it better . . . at less cost

Typical cost-saving applications are pictured for you in *Gregory Indus-*

tries, Inc.'s folder on Nelweld method of stud welding. There are excellent diagrams showing how studs are welded. These are accompanied, in text, by sequence of the process. Offices and distributors are listed for your convenience. G-1

76 "Transportation for San Diego" . . .

. . . is a fat, spiral bound report prepared for *City Council and Harbor Commission of San Diego, Calif.*, by *Industrial Survey Associates*, economic consultants, San Francisco. Book covers population and traffic growth; transportation — railroads, highways, air, and water; and manufacturing and warehouse sites. Summary and recommendations wind up main section with an appendix following which includes population analysis, low-level route East, pipe line, and statistical data. Book has a number of charts and maps.

77 "Timepruf" steel buildings

Stran-Steel nailable framing, employed in Timepruf buildings, is claimed unsurpassed by any other type of framing system . . . for permanency, flexibility and economy. All joists and studs have a unique "nailing groove" with great holding strength. Buildings should prove of interest to industry, agriculture and commerce. A brochure, from *Kyle Prefab Steel Co.*, will tell you of type, size and design selection, and building specifications.

78 Leaflet explains effective water sampling

Allis-Chalmers Manufacturing Co. releases a new leaflet describing some factors involved in obtaining useful samples required for proper control of water conditions in a power house. Publication tells which samples are important, when samples should be taken, where to obtain them, and how they should be drawn. 28X7969

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Also commercial grades available which cut packaging costs 50%. Call us for all types of wax, grease and oil rust preventives which meet other government specifications. Write for free catalog and samples of Vapor-Wrapper.

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79

Proof of the pumping is in the pumping

Emphasis on quality is the keynote of *Fiese & Firstenberger's* brochure on company's high efficiency turbine pumps. A well-displayed sectional drawing of a turbine pump, accompanied by explanation, covers two full pages, and points up salient features of working parts.

Circle key number on rip-out card for literature you want

80

On Magna drills

Magna Engineering Corp. issues a new price list and quotation sheet for its line of Magna drills and parts. Folder includes specifications, drawings, diagrams and ordering information.

81

Read about how to do it The Chainveyor way

Here is a sturdy 12-page booklet on a new light capacity, low cost, overhead conveyor from *United States Spring & Bumper Co.* Advantages, fields of application, Chainveyor components, capacity, installation, and ordering instructions are listed and well illustrated by chart, photo and line drawing. Publication will be valuable to any materials-handling man.

82

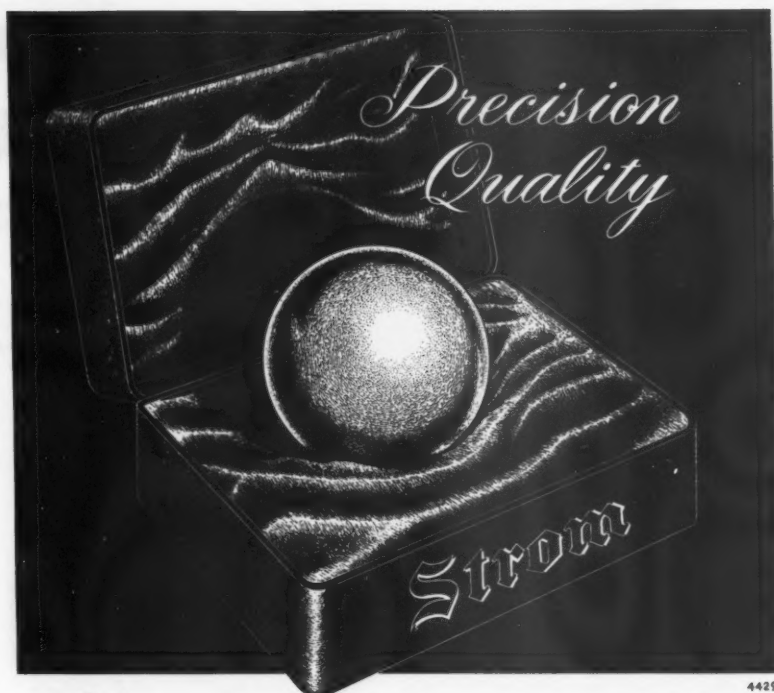
Carbon and graphite products information published

A 20-page two-color brochure from *Union Carbide and Carbon Corp.* will give you a rundown of National Carbon, Graphite, and "Karbate" impervious carbon and graphite products. Pages one and two are devoted to physical characteristics and corrosion resistance tables. Pictures, diagrams, and text following describe chemical, metallurgical, mechanical and electrical applications. S-5005

83

Ten reasons why Delta power tools...

... give you increased production, better quality, lower costs. Here, in condensed folder form, you will read details of low original investment, maintenance cost, power consumption, etc. Pictures, text and specifications include: 14-in. standard drill presses; carbide tool grinders; 7-in. metal shapers; welders; and surface plates. *Rockwell Manufacturing Co.*



4429

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Quick falls for the big ones, such as this 6½ ft. Douglas fir, are easy when this Electric Chain Saw goes to work. Furnishing the 180 cycle, 3 phase, 220 volt current is an electric generator, powered by a Model VF-4, V-type, 4-cylinder Wisconsin Heavy-Duty Air-Cooled Engine.

In the timber country and in many other fields, Wisconsin Engines are preferred power for these reasons:

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- Rugged construction for heavy-duty service.

Today, write for the new 64-page application and specification booklet, covering all 4-cycle single-cylinder, 2-cylinder and V-type 4-cylinder models, 3 to 36 hp.

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WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

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WESTERNERS AT WORK

ARIZONA

Arizona Public Service Co.

Lee Poe, manager of this Phoenix concern's southern division, is elected a vice president.

Natural Gas Service Co. of Arizona

P. P. Stathas is elected president; *L. H. Bell*, executive vice president; *B. McWhorter*, vice president; *S. Nason*, treasurer; *S. Jerman*, secretary; and *E. N. Byrge*, controller.

CALIFORNIA

J. C. Copeland Co.

Hugh J. Pye, retired Bank of America assistant vice president, is now associated with J. C. Copeland Co., a Beverly Hills factoring firm.

Kaiser Engineers Division of Henry J. Kaiser Co.

Arthur C. Stern joins Oakland staff as a member of firm's air and stream pollution engineering group. He was formerly chief of engineering unit of Division of Industrial Hygiene and Safety Standards of the New York State Dept. of Labor. *Maurice Nichols*, formerly consulting engineer at Kaiser's

Oakland office, transfers to New York where he assumes managerial duties of firm's office there.

Link-Belt Co.

Harvey V. Eastling, formerly assistant general manager of Link-Belt Pacific division, is appointed division's general manager with headquarters in San Francisco. He succeeds *Ralph M. Hoffman*, retired.



H. V. Eastling
Link-Belt Co.



C. V. O'Hara
Connor Spring
Mfg. Co.

Connor Spring Manufacturing Co.

Charles V. O'Hara is promoted from position of assistant manager to that of manager

of San Francisco plant. *C. L. Willard* takes position of chief engineer for company. His former duties of San Francisco production manager are assumed by *John Anderson*, a new addition to Connor's staff.

Consolidated Vultee Aircraft Corp.

Several high level appointments and title revisions are now in effect at Convair Pomona. *C. D. Perrine*, formerly assistant division manager and chief engineer, takes title of assistant division manager, engineering. *R. C. Loomis*, formerly division works manager, is named assistant division manager, operations. *Millard Mrvichin*, of concern's general offices, is named acting manager of administrative services. He replaces *H. W. Rickert*, resigned. *G. M. Robertson*, former executive assistant to chief engineer, is appointed assistant chief engineer. He reports directly to *C. D. Perrine*.

Pabco Products Inc.

George M. Nummy is promoted from position of plant superintendent to that of plant manager of Pabco's Redwood City factory. *Harry E. Kaiser* is appointed technical director. He has been serving as chief development engineer. *Harry H. Surprise* is named general service manager.

Brea Chemicals, Inc.

This Los Angeles subsidiary of Union Oil Co. names *R. L. Luckhardt* head of its newly formed technical service division.

Hydro-Aire, Inc.

Leslie E. King is appointed a project engineer by this Burbank transistor manufacturing firm. He will be in charge of firm's transistor research and development program. He has been associated with Consolidated Vultee Aircraft Corp., San Diego, in research and development work on guided missiles.

Standard Oil Co. of Calif.

D. K. Harger is named general manager of Standard Oil's refinery at El Segundo. He was formerly manager of operations there. He succeeds *C. A. Pollard*, deceased.

Owens-Illinois Glass Co.

J. Gordon King, vice president of company, and former chief engineer of its Pacific Coast division, San Francisco, resigns to become vice president in charge of Plax Corp., Hartford, Conn.

Dewey & Almy Chemical Co.

Arthur D. Angell, formerly manager of firm's West Coast operations, is elected vice president of its Western division, Oakland.

Western Oil and Gas Association

Felix Chappellet is appointed secretary and acting general manager of this Los Angeles association. He replaces *John M. Peirce*, recently appointed director of finance of State of California.

William Miller Instruments, Inc.

George W. Downs, now vice president and chief engineer of this Pasadena scientific instrument firm, is responsible for design and construction of vibration and strain measuring instruments. *Edwin M. Graham*

SCHROCK MOTORIZED HEAD PULLEY

For Belt Conveyors and Bucket Elevators



"PULLEY WITH THE DRIVE INSIDE"
Safe, compact, simple . . . no chains, no belts, no sprockets, no exposed motors.

Built by YUBA for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

Built and sold in other states by Iowa Manufacturing Company, Cedar Rapids, Iowa.

Pulley shell of this revolutionary head pulley rotates around electric motor and reduction gears, which are held stationary by torque arm attached to conveyor frame. Quickly in-

stalled — requires no more room than idler pulley. All moving parts protected against weather, grit, dirt. Diameters 16" to 48". 5 to 75 hp. for voltages to 2300. Job proved.

Write TODAY for folder and name of nearest distributor.



YUBA MANUFACTURING CO.

Pulley and Sprocket Dept.

Phone 628

Benicia, Calif.

52

is elected vice president and treasurer. He was formerly with Standard Machine Works of Pasadena. *Charles T. Munger*, a partner in law firm of Wright, Peeler & Garrick, is named secretary of William Miller Instruments. *Paul Ashway* takes over as industrial engineer.

Seaporcel Metals, Inc.

Leo Bernard Farrell, sales manager of Seaporcel Metals, Inc., manufacturer of architectural porcelain enamel, resigns his post at main plant, Long Island City, N. Y., to become office and plant manager of Seaporcel Pacific, Inc., Long Beach, Calif., affiliate.

Lac Chemicals, Inc.

Charles D. Thurmond is appointed assistant to firm's president, Culver City. He was most recently with Brea Chemicals, Inc., as manager of market research.

Rossotti California Lithograph Corp.

Frank E. Falk is named vice president and general manager of this San Francisco firm.

COLORADO

Pueblo Gas and Fuel Co.

James Dresen joins this Pueblo firm as vice president and general manager. He was formerly superintendent, industrial and commercial gas sales, Public Service Co. of Colorado, Denver.

Colorado Fuel and Iron Corp.

In addition to his duties as superintendent of Mechanical department at Pueblo plant of CF&I, *Carl Gustafson* is appointed director of mechanical maintenance by firm.

Ideal Cement Co.

S. A. Gretencort, former plant manager of company's cement and plaster plants at Portland, is transferred to staff of general superintendent's office in Denver. His Portland position is taken over by *A. W. Hooton*, formerly manager of firm's Devil's Slide plant. *Horace Straight* is promoted from assistant plant manager at Devil's Slide, to plant manager there.

MONTANA

United States Gypsum Co.

R. W. Deneke is appointed works manager of company's plant at Heath. He replaces *H. E. Vogt*, transferred to Detroit plant as works manager. Deneke was board plant superintendent at Plaster City, Calif., before his promotion.

NEVADA

Kaiser Aluminum and Chemical Corp.

H. Phillips becomes general superintendent of company's fluorspar operations in Fallon. He replaces *H. S. Fowler*, who has transferred headquarters to Oakland, Calif., and is engaged in exploration work for Kaiser.

The Eagle-Picher Sales Co.

John W. Kenney, Jr., is appointed plant manager of all Eagle-Picher diatomaceous earth operations at Clark. He succeeds *Thomas A. Copeland*, resigned.

OREGON

Raw Materials Survey

John Gierhart, of Eugene, joins Portland firm as a research assistant. *Albert O. Bar-*

SIMPLIFIED



packing storage shipping

Work was simplified and savings made possible when the Stanley Steel Strapping System was used at The Bassick Company's South Plant, Bridgeport, Conn.

Casters formerly packed in unwieldy barrels now are packed in lightweight cartons, steel strapped and quickly stored by sizes. On shipment, orders are filled faster, cars or trucks loaded easier. Maximum protection in transit is provided. Bassick distributors save time and money in storing and re-shipping to their customers.

In almost every type of plant — with almost every type of product — substantial savings are being made in packing and handling by the Stanley Steel Strapping System. Call in the Stanley Packing and Shipping Engineer. He'll install the Stanley Steel Strapping System on a 30-day trial. No obligation . . . mail coupon.

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TOOLS

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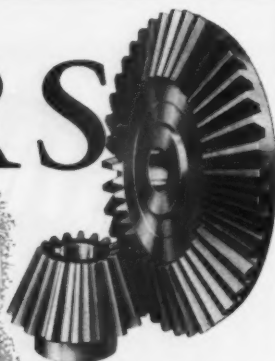
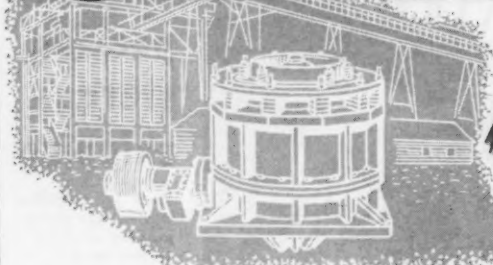
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GEAR DRIVES



JOHNSON GEAR
AND MANUFACTURING CO.

45 YEARS SERVICE TO INDUSTRY
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tell resigns from his position of managing engineer. He will continue as a consultant, devoting half time to Survey work.

St. Helens Pulp & Paper Co.

Elza Weed is named superintendent to succeeds *P. Buccini*, who is now order department supervisor. Firm is located at St. Helens.

Aetna Plywood & Veneer Co.

Phillip Klupenger is appointed manager of concern's West Coast lumber purchasing division. His offices will be in Terminal Sales building, Portland. His experience in field includes helping to organize and being first manager of Copeland Wholesale Co., branch of J. W. Copeland Yards.

Iron Fireman Manufacturing Co.

Wayne F. Strong is elected to post of vice president in charge of manufacturing. He will head all production in company's plants



W. F. Strong
of Iron Fireman Manufacturing Co.



R. V. Jack
of Iron Fireman Manufacturing Co.

including one in Portland. He is replaced as manager of Electronics division, Portland, by *Robert V. Jack*, formerly division's assistant manager.

UTAH

Columbia-Geneva Steel Division
of U. S. Steel Corp.

John K. Hayes is promoted to post of supervisor of raw materials exploration of Utah operations. He is succeeded as superintendent of Keigley quarry by *R. W. Pett*.

U. S. Atomic Energy Commission

Joseph W. Joyce becomes superintendent of Commission's mill in Monticello. He was formerly associated with Washington State College, division of Industrial Research. He succeeds *Dale Matthews*.

WASHINGTON

Washington Water Power Co.

J. Harry Lucas is transferred, by company, from Lewiston, Idaho, to Spokane as division manager.

The Long-Bell Lumber Co.

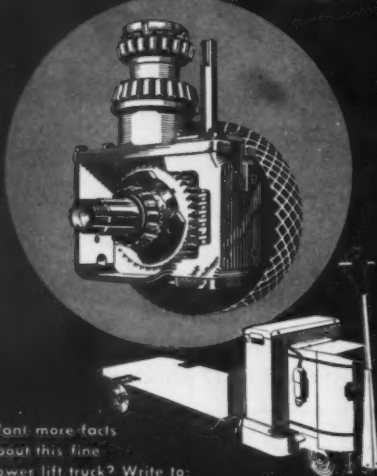
R. T. Frost, formerly of Ernst and Ernst in Seattle, is named chief clerk of Long-Bell's Longview division. He replaces *A. L. Bogan*, retired.

Shell Oil Co.

R. W. McOmie is appointed manager of Shell's new refinery at Anacortes. Presently manager of concern's refinery at Wilmington, Calif., he will be replaced by *P. J. Merkus*, of New York, about Jan. 1. During construction of Anacortes facility, McOmie will devote full time to coordination of various activities in connection with project,

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and to development and training of an operating organization.

Weyerhaeuser Timber Co.

J. R. Titcomb is named assistant to this Tacoma firm's general manager. Succeeding him as manager of company's Springfield, Ore., lumber division, will be George H.



G. H. Weyerhaeuser J. R. Titcomb
of Weyerhaeuser Timber Co.

Weyerhaeuser. Charles W. Preppernau, branch logging manager, will become assistant lumber division manager.

Todd Shipyards Corp.

Robert G. Zener is appointed general manager of Seattle division to succeed R. J. Lamont, retired. He is replaced as assistant general manager by James F. Goodrich, formerly general superintendent.

ASSOCIATIONS ELECT

California Manufacturers Assn.

President, Richard A. Livingston, president of Tubing Seal Cap, Inc., San Gabriel, Calif.; treasurer, J. H. Pengilly, vice president of Square D Co., Los Angeles; vice president, R. J. Miedel, president, United Can & Glass Co.; and secretary, Ivan L. Johnson, president, Pacific Steel Casting Co., Berkeley.

American Society of Mechanical Engineers, Rocky Mountain section:

Chairman, James K. Richardson, U. S. Reclamation Bureau; vice chairman, Donald C. Neithercut, American Steel and Iron Co.; secretary, Professor R. B. Stewart, University of Colorado.

Utah Manufacturers Assn.:

President, W. R. White, president of W. R. White Co., Ogden; first vice president, A. R. Mickelsen, Draper poultry executive; second vice president, Harry B. Roberts, Ideal Cement Co., Union division, sales manager; and secretary, H. H. Fisher, vice president and general manager of Fisher Brewing Co.

Rocky Mountain Management Club:

President, John N. Kerr, Jr., director of information department, Public Service Co. of Colorado; first vice president, Harry D. Cole, manager of industrial relations, Heckethorn Manufacturing Co.; second vice president, Paul R. Marshall, Heiland Research Corp.

California Metal Trades Assn.:

President, A. A. Browne, vice president and general manager, Pacific Electric Manufacturing Co.; first vice president, C. F. Robie, president of Gilro Machine & Stamping Co.; and second vice president, D. E. Golden, executive vice president, Schlage Lock Co.

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SIZE: Takes car 9 ft. x 14 ft. Effective door opening 4 ft. 7 in. high. **COMBUSTION SYSTEM:** Six wide-range nozzle-mix burners on 830 Btu gas 2 to 20 psi, maintain continuous maximum temperature 1850° F. Automatic temperature control and safety shut-off system. Sand seal.

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Check these bar types and sizes:

- **SQUARE, 12" long**
12 sizes, 1" x 1" to 4½" x 4½"
- **RECTANGULAR, 18" long**
40 sizes, 1" x 1½" to 4½" x 10"
- **SOLID-ROUND, 16" long**
23 sizes, 1" to 12" diameters
- **CORED-ROUND, 16" long**
24 sizes, 3½" O.D. x 1" I.D. to 9" O.D. x 5½" I.D.

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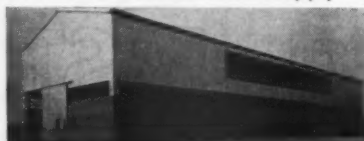
Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

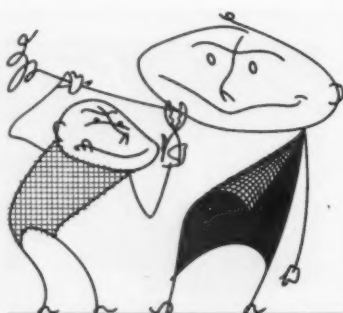
Promotions at Minnesota Mining

John V. Monley is made sales manager, covering San Francisco and Seattle areas, for industrial tape division of Minnesota Mining & Manufacturing Co., St. Paul. He joined company in 1941 as a salesman. Jess G. Utter, who has also been with company since 1941, is promoted to position of sales manager in Los Angeles territory.

New home for Brown Steel Supply



Offices and warehouse of Brown Steel Supply Corp., Los Angeles, occupy new quarters at 4000 Noakes St. Floor space provided is 12,000 sq. ft., and building design allows for future expansion to a total of 48,000 sq. ft. One rail car spot is provided inside building, served by 10-ton crane. A



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wide range of rolled sheet and strip steel is stocked in plant.

New market research firm

Survey Services is established with headquarters in San Francisco. Firm offers services in interviewing, statistical work, questionnaire development, sample construction and library research, separately or in combination, for Western clients. It has been organized as an affiliate of Field Research Co., which will continue to provide custom-tailored and packaged research services. Manager of new Survey Services is James C. Campbell, who was formerly operations manager of Field Research.

Machine tool firm organized

Articles of incorporation for U. S. Equipment Corp., a new company which will handle machine tools, are filed in Olympia, Wash., by Walter A. Toly. Joining him in venture are M. E. LaCounte, Milton Tschache and John Ruffatto, all of Spokane.

Orangeman

Harry N. Dietz is appointed sales manager for Pacific Northwest district of Orangeburg Manufacturing Co., Orangeburg, N. Y., manufacturer of underground electrical fibre conduit and bituminized-fibre drain and sewer pipe. Dietz will maintain headquarters in San Francisco with Martin Noack, district sales manager for Pacific Southwest.

Northwest Lead sales manager

Glenn P. Snarr is named sales manager for Northwest Lead Co. in Northern California, with his offices in San Francisco.

Pennsalt appointment

James G. Baldwin becomes district sales manager in charge of Los Angeles office of Pennsylvania Salt Manufacturing Co. of

MILLER-ROBINSON CO.

**HIGH FREQUENCY
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**Production — Tooling
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Washington. He will specialize in heavy chemicals in California territory. He joined Pennsalt in 1948.

Move SKIL branch

Portland branch office of SKIL Corp., Chicago, moves to 5616 N. E. Glisan St. New quarters provide improved facilities for complete sales and service on SKIL tools. Firm now has 34 branch offices in United States and Canada.

Rust Proof transfer

Neil Petersen, technical representative for Parker Rust Proof Co., is transferred to Pacific Coast Region office, Maywood, Calif., after eight years service for company in Detroit area. Petersen brings extensive experience in working with automobile manufacturers to Parker's automotive accounts in the Pacific region.

Boise headquarters

Henry Throop is appointed Idaho sales representative of U. S. Steel's Columbia-Geneva Steel division, with headquarters in Boise. He has served as technical field representative and on special assignment to product distribution staff of Columbia-Geneva's general sales office in San Francisco.

New quarters for Clothier

Van D. Clothier, Inc., West Coast representative of Wolverine Tube division, Calumet & Hecla, Detroit, Mich., moves its northern California branch to larger quarters in San Mateo, Calif. John A. Marshall will continue as branch manager. Clothier maintains West Coast stock of copper tube at its mill depot in Los Angeles, which is also firm's headquarters.



J. A. Marshall
Van D. Clothier, Inc.



H. L. Pohndorf
National Welding
Equipment Co.

Sales manager for National Welding

Henry L. Pohndorf is appointed sales manager of National Welding Equipment Co. of San Francisco. He will retain his former position of chief engineer as well. A graduate engineer of M.I.T., Pohndorf has been with the company over seven years.

New outlets for A-C motors

Vinson-Carter Electric Co., Phoenix, is named distributor for Allis-Chalmers motors in Arizona. Senior partner in Vinson-Carter firm is B. F. Carter.

Allis-Chalmers also appoints Portland Electric & Plumbing Co., Portland, to handle motors, controls and transformers in Oregon and five Washington counties. Leslie G. Gilbert is president of Portland Electric.

Promotion for Hoffman

S. V. V. Hoffman is appointed district manager, West Coast sales district, of Raybestos-Manhattan, Inc., Passaic, N. J. Formerly regional manager in Los Angeles, Hoffman now supervises sales of industrial

rubber products, mechanical packings and asbestos textiles through firm's offices at Los Angeles, San Francisco and Seattle. He will continue to headquarter in Los Angeles. He has been with company since 1939, on West Coast since 1947, and Los Angeles regional manager since 1951.

Hawksley services expand

Ray W. Hawksley Co., San Francisco, is appointed exclusive California distributor of biological product manufactured by Reliance Chemicals Corp., Houston, Tex. Product, known as Bionetic, increases efficiency of bacterial digestion in treating sewage and industrial waste. Ray W. Hawksley is a chemical engineer specializing in water treatment and waste disposal.

Open Compton plant

General Pipe & Supply Co., Southern California steel jobber, begins operations in new plant located in Compton manufacturing district near Los Angeles. Facility has over 80,000 sq. ft. of space in three bays, served by overhead crane, and houses stocks of structural steel, hot rolled plates and sheets, strip, flats, rounds and squares and bar shapes. This is company's third expansion move since it began operations in 1939.

Sky-Worker in West

Miller-Robinson Co., Los Angeles, is named by Tey Manufacturing Corp. as West Coast distributor for Hydro Sky-Worker, new maintenance and construction tool for work in difficult places. Sales will be under direction of Robert D. Bennett, formerly central states sales manager for Miller-Robinson, assisted by Bernard Scheuer, who



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AUTOETTE Pickup Trucks are famous for their amazing economy. Only 3 cents for electricity for 12 hours of daily hauling—30 miles of travel. Less than a dollar a month—\$10.00 a year—1/5 cent per ton-mile!

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Buffalo, N. Y.
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worked with Tey Manufacturing for several years on development of Sky-Worker tool.

Soulé Steel in Seattle



New fabrication plant and warehouse of Soulé Steel Co. on a 5-acre tract in Seattle consists of a 30,000 sq. ft. main building and 3,700 sq. ft. separate office building. Main building, of Soulé steel frame construction with corrugated aluminum roof and siding, has 5-ton traveling crane, two truck bays and covered rail loading dock. Harold A. Hovind of Seattle was architect for office building; Stevenson & Rubens, consulting engineers on plant structure; and John H. Sellen Construction Co., contractor. Products that are installed, fabricated or warehoused by plant include standard steel buildings, steel and aluminum windows, steel doors, reinforcing steel, and other construction items.

Join L. B. Foster Co.

George F. McDonald and V. J. Hornak join sales staff of Los Angeles office of L. B. Foster Co., nation-wide supplier of steel sheet piling, rails, track materials and accessories, pipe and pipe fabrication. Hornak was department manager of Houston, Tex., Chamber of Commerce from 1949 to 1952, and for three years prior to that served with Joint Export-Import Agency in Munich,

Germany. McDonald formerly was associated with Tube Sales Co. and, earlier, with Frick & Lindsay Co. of Pittsburgh.

Arc-welding consultant

A. G. Bissell is appointed consultant on arc-welding engineering problems for Metal & Thermit Corp., with offices in Seattle. Bissell, who retired in June after 17 years of civilian service for welding, casting and forging branch of Bureau of Ships, U. S. Navy, is undertaking this assignment in addition to other duties. Metal & Thermit has headquarters in New York.

New Oakite men

Oakite Products, Inc., appoints as technical service representatives R. W. Krajicek, to cover Montana, and Joseph M. Newey, to serve metal accounts in Salt Lake City. Krajicek was formerly with Phillips Petroleum Co. Both men recently completed a seven-week training course at Oakite headquarters in New York and in the field.

Trailmobile expansion

Trailmobile, Inc., Cincinnati, subsidiary of Pullman, Inc., opens new \$500,000 sales and service office in East Oakland, and company president, William A. Burns, states general trend for truck-trailer industry is one of expansion for next several years, particularly in California and Western states.

Stephens joins Resin Industries

Allan Stephens becomes special assistant in industrial sales division of Resin Industries, Inc., Santa Barbara. His duties include preparation of technical sales data on all Resinite insulation tubing and sleeve-

ing and supervision of sales promotion activities. Stephens did graduate work in chemistry at Princeton and for past three years was engaged in technical service and development of textile colors for Sherwin-Williams Co. in New Jersey.

Vice president of Pacific Wire

William H. Griffith, sales manager for past eight years of Pacific Wire Works Co., Seattle, is elected vice president of that company, which manufactures industrial wire cloth. He continues to have charge of sales.

Brenner adds new lines

Brenner Co., manufacturers' agents of Pasadena, Calif., become distributors for alloy steel and tank heads manufactured by Sheffield Steel Corp., Houston, and socket head and other screw products of Strong, Carlisle & Hammond Co.'s Mac-It division, Cleveland.

Open Western district office

H. K. Ferguson Co. names George W. Llewellyn as manager of its new Western district office in San Francisco. New office offers complete engineering services in area of California, Washington, Oregon, Idaho, Nevada, Utah and Arizona. Llewellyn, who has been with Ferguson Co. for almost nine years, has served as assistant project manager, project manager and Southern District construction manager; for past two years he has been project manager at metallic titanium plant completed in August by Ferguson Co. for Titanium Metals Corp. of America, at Henderson, Nev.



G. W. Llewellyn
H. K. Ferguson Co.
R. B. Ingebretsen
Modern Equip. Co.

To handle Webb conveyors

R. B. Ingebretsen, manager of Modern Equipment Co., Salt Lake City, is appointed factory representative in Utah for Jervis B. Webb Co. of California. Webb Co. designs, manufactures and installs conveyors.

Sell multiwall bags in Utah

Crown Zellerbach Corp. opens multiwall bag sales office at its Salt Lake City headquarters. Company manufactures full line of multiwall bags at Port Townsend and Camas, Wash., and San Leandro, Calif.

Farr representative

Air Filter Sales & Service Co., Inc., San Francisco, becomes sales and service representative in Northern California for Farr Co., Los Angeles. Air Filter has handled Far-Air line of air filtration equipment for past five years.

Space heaters

Wheel Industries, Inc., San Francisco, is appointed exclusive distributor in Northern California and Western Nevada for Mortemp Heat Machine Co.'s portable space heaters for construction industry. Mortemp headquarters are in Seattle.

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POWER LIFT TRUCKS

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IRA G. PERIN CO.

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BUILDINGS—from 2,700 to 22,500 sq. ft. available for lease. Also land in lots up to 100 acres.

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Inventor-Idea man, aggressive, capable, age 41, practical and sincere. Not graduate engineer, but broad mechanical experience with natural inventive talents. Can create, design and build own models. Several original marketable items under way now including wheel goods, yard toy, and punch press production products.

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821 MATEO ST. L. A. 21 1930**

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Alloys as they are supposed to be

Corrosion Resistant—
Clean metal

Strong—
Low in cracking

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THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS,

DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

FORECASTS—SHORT AND LONG RUN

Business opportunities

Latest study by the Western division, National Association of Manufacturers, forecasts tremendous growth in the number of new business firms to be established in the West by 1960.

The following statistics are compiled from the Bureau of Labor Statis-

tics, U. S. Bureau of Census and National Association of Manufacturers.

By 1960 it is estimated that the number of business firms in the 11 Western states will have increased 34.5%. Total number of business firms predicted for the West by 1960 is 750,000. There were 557,300 firms in the 11 Western states in 1950.

State	No. firms 1950	No. firms 1960	New firms	Investment required (millions)	New workers 1960 (thousands)	% increase
California	311,900	439,800	127,900	\$22,000	2,000	41.0
Colorado	37,100	45,200	8,100	1,400	117	21.8
Nevada	5,400	7,300	1,900	310	25	34.5
Utah	14,900	19,000	4,100	762	63	27.5
Wyoming	8,300	9,800	1,500	257	20	18.0

Business outlook

Results of a poll of the California Manufacturers Association, on the outlook for the first quarter of 1954, indicate business and employment in California will remain at or close to the existing high level, but manufacturers don't hold out much hope for gains in over-all business activity.

The indication is that dips below the business level of early 1953 would seem to be in prospect for many lines during the early part of the new year.

Forty per cent of the executives said they expected their own company to book orders in the first quarter of 1954 in the same amount as in the first three months this year. But 38% expect a smaller volume of orders and only 22% expect an increase. This is the smallest number of manufacturers to predict a larger volume since the association started making its quarterly polls more than four years ago.

The latest figures on the state of business and employment in California, for the third quarter of 1953, show that business in the three-month period was about 10% ahead of the third quarter of 1952.

Factory employment in the state during the third quarter averaged 71,700 more than in the third quarter of last year. This is the smallest year-to-year gain in numbers employed by California manufacturers since the second quarter of 1950.

Planes, planes, planes

Aircraft and aircraft parts is the largest manufacturing industry not only in the Los Angeles metropolitan area but in the entire state of California. Employment by this industry accounts for 27% of the total manufacturing payroll in Los Angeles, according to the California Division of Labor Statistics.

Three million dollars a day, or three-quarters of a billion each year, are being poured into the Los Angeles area through payrolls of six major aircraft manufacturers. A comparison of this industry with others in the area shows that in both payroll and employment, the aircraft total exceeds that of the next three ranking industries combined. The industry is now second largest in the nation.

L. A. still building

For the first ten months of 1953, Los Angeles' new construction valuation exceeded the combined 1952 totals of New York City (five boroughs), Chicago, Detroit, Houston, Dallas, Philadelphia, New Orleans, Denver, Baltimore and Boston, according to the Los Angeles Chamber of Commerce.

The \$926,020,098 which went into building new homes, offices and factories this year was \$10,651,943 more than the total construction valuation of the above-listed cities.

Augmented by a vast \$82,516,609 October outlay, building spending for 1953 became the third greatest in Southland history, trailing only the 1952 valuation and the billion-dollar year of 1950.

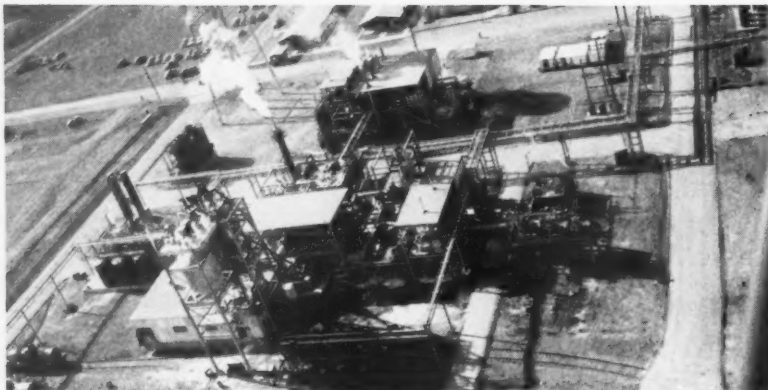
With two more months of construction still remaining, a new billion-dollar-plus mark will be established this year. Of the present spending \$587,901,547 was earmarked for residential construction.

October building in the city of Los Angeles amounted to \$34,603,571, and the San Fernando Valley led the five areas reporting within the city, with a valuation of \$20,402,528.

And still they come

California has gained 1,489,000 people since 1950, to swell the total population to 12,075,000 by mid-year 1953, reports Maurice Sparling, state superintendent of banking.

In his monthly report to the Governor, Sparling said 41.5% of the increase was in the Los Angeles area, 19.3% in San Francisco and 10.4% in the San Diego area. Business activity during August was reported 10% higher than in August 1952, but 3% lower than in July 1953.



FIRST PHENOL PLANT—Monsanto Chemical Co.'s new phenol plant (first of its kind on Pacific Coast) will produce 20,000,000 lb. of phenol a year, 600 tons of salt cake (sodium sulphate) monthly, and 700 tons of sodium sulphite. Thirty per cent of the phenol output will go to Monsanto's own plants—Santa Clara, Calif. (resins, dry glues), Seattle (glues, resins), Long Beach (styrene). Phenol is a raw material used in manufacture of exterior grade plywood adhesives, phenolic plastics and resins, pharmaceuticals, agricultural chemicals, oil additives and wood preservatives. Phenol is made from sulphuric acid, obtained from an adjoining new plant jointly owned by Monsanto and Tide Water Associated Oil Co. The two plants together represent an investment of \$7,000,000.

ARIZONA

FOUNDRY VENTURE—Salt River Foundry, organized by Morris Bennett and James O'Hara, both former Californians, will soon begin production of pipes and fittings in its 60 x 265-ft. plant now nearing completion in Phoenix. Operations will employ up to 35 men.

PLAN FUTURE POWER UNIT—Arizona Public Service Co., Phoenix, places order for re-heat steam turbo-generator to be used in new 100,000-kw. power plant still in planning stages. Company is surveying possible sites for \$14,000,000 plant, with two-year construction period scheduled to begin in spring of 1954.

ALUMINUM EXPLORATION—Both Reynolds Metals and Kaiser Corp. are reported to have geological survey crews in Arizona exploring for aluminum-bearing ore deposits of commercial value using newly developed techniques in metallurgy. John W. Adams, Arizona prospector and mineralogist, has reported extensive bauxite deposits exist in the state.

FIRMS EXPANDING—Office of Defense Mobilization issues tax amortization certificates to three Arizona firms on following new projects: AiResearch Manufacturing Co., Phoenix, \$514,000 addition for research and development of military aircraft; Metalcraft Manufacturing Co., Phoenix, \$27,050 expansion to produce defense items; Goodyear Aircraft Corp., Litchfield Park, \$59,690 expansion to produce aircraft parts.

JET FLIGHT CENTER—Aeronautical division of Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., sets up wintertime jet aircraft flight center at Tucson Municipal Airport. T. U. Grove, formerly manager of flight operations at Minneapolis, is in charge of new center. Equipment and flight personnel have been transferred from Minneapolis.

Honeywell produces electronic automatic pilots and other automatic controls for jet aircraft.

ADD TO COOLER PLANT—Foundations are laid for \$100,000 addition to International Metal Co.'s evaporative cooler plant in Phoenix. Over-all length of plant will be 1,200 ft., with roofed area of 225,000 sq. ft.—reportedly the largest factory of its kind in the world. Co-partners in the locally-owned firm, which produced 250,000 cooler units last year, are A. D. Goettl and Gust Goettl.

MAY SELL TO BOEING—Grand Central Aircraft Co. considers sale of its holdings at Tucson, consisting of hangars leased in 1950 from Tucson Airport Authority, and is negotiating with Boeing Airplane Co., Seattle. Grand Central operations, at present modification of B-47 Stratojets for U. S. Air Force, now employ about one-fourth the 1951 peak number, and to meet cutback in military aircraft orders, company will either move Glendale operation to Tucson or sell Tucson facilities outright.

GARMENT PLANT—Kelby Garment Manufacturing, Inc., opens plant in old Terminal Building at Sky Harbor, employing 40 in manufacture of women's wear. Firm, owned by Charles Odell, was moved to Phoenix from Torrance, Calif., and is the tenth garment manufacturer to enter the area in past six years.

CALIFORNIA

MOVE TO PETALUMA—Western Condensing Co. moves executive offices from San Francisco to Petaluma, Calif.

BUY WESTERN FIRM—Pettibone-Muliken Corp., Chicago, acquires assets of Wood Manufacturing Co., North Hollywood, to be operated as Pettibone-Wood Manufacturing Co., a wholly-owned subsidiary. Operations continue at same

location with same personnel. Road-surfacing equipment developed and manufactured by Wood is now added to equipment for road building, materials handling and mining manufactured by Pettibone and its subsidiaries.

ORGANIZE NEW FIRM—Lusk, Incorporated, is formed in Anaheim for design and production of machines and equipment for manufacturers and, now occupying temporary quarters, will build plant in that city. President of new company is Arthur I. Lusk, who, with Ralph Wilcox, Jr., tool designer, resigned recently from Rosán Inc. to form Lusk, Inc.

EXPAND MISSILES RESEARCH—Lockheed Aircraft Corp., Burbank, sets up new Missile Systems division for design, development and production of pilotless aircraft and missiles. Headquarters at present are Lockheed's Burbank plant, but it is anticipated new division will be nucleus for expansion beyond research and development stage. Vice president and general manager of division is Elwood R. Quesada, retired AF general who is associated with Olin Industries.

MICROWAVE PROJECTS—Stanford University begins building new \$200,000 microwave laboratory in stepped-up program of microwave research. Building, 15,000 sq. ft. in area, is scheduled for completion in spring, when it will be occupied by staff of about 75, and later equipped with linear accelerator and underground radiation vault. Present laboratory houses billion-volt linear accelerator, world's largest, and, after completion of separate microwave laboratory, will be used full time for nuclear research and designated the high energy physics laboratory. Another linear accelerator for medical use is being built for Stanford School of Medicine in San Francisco.

Stanford Research Institute, an affiliate of Stanford University, acquires facilities of Microwave Engineering Co. of Los Angeles for use as part of its engineering division's radio systems laboratory. Robert Krausz, former vice president and chief engineer for Microwave Engineering, will head research operations, and present staff of 15 persons will be retained.

NEW SPOT FOR ARCHER LABELS—Archer Label Co. completes move to new quarters in Los Angeles and resumes full production of self-adhesive labels. Increased space is expected to almost double output.

BIG BUSINESS—Longren Aircraft Co., Torrance, receives purchase orders totaling over \$1,000,000 from Ryan Industries, Detroit. Longren Aircraft manufactures components for aircraft and missile industry.

U. OF C. ENGINEERING LAB—Construction starts on new Soil Mechanics and Bituminous Materials Laboratory at University of California's Engineering Field Station in Richmond. New one-story building, about 4,000 sq. ft. in area, will be used for research in soils, asphaltic mixtures and granular materials.

FONTANA MILLS WILL GROW—Kaiser Steel Corp. plans to expand Fontana rolling mills in \$8,000,000 im-

America's New Railroad

*Looking ahead
on the Santa Fe*



You've been reading a lot this year about things that make and keep the Santa Fe "America's New Railroad."

New cars, new locomotives, new yards, new tracks, new communication methods, new streamliners and new freight services.

So it goes, day-after-day, on the Santa Fe—this building new. For only by constantly building and rebuilding can a railroad stay new and ready for the future.

So it will be in '54 and in the years ahead—with important new projects like these now under way:

NEW CHIEF TO SAN FRANCISCO... In early '54 a whole new streamlined train—the *San Francisco Chief*—from Chicago to the Golden Gate in 47½ hours, via the San Joaquin Valley through the colorful Southwest Indian Country.

NEW RAILROAD TO DALLAS... 48.5 miles of it. Now being planned to provide direct mainline service to shorten time and mileage for passengers and freight between Dallas and Chicago and points in Oklahoma, Kansas and the Midwest.

NEW IMPROVEMENTS ALL ALONG THE LINE... Little things, big things—all things that are important to

one people who ship and ride on "America's New Railroad."

The millions of dollars this newness costs Santa Fe doesn't cost *you* a single penny in the taxes you pay.

* * * *

All these things help to provide better service for Santa Fe patrons. They inspire Santa Fe people—the men and women whose thoughts, ideas and physical efforts are what make the operation of "America's New Railroad" possible.

But their feeling for their railroad goes much deeper. It's a combination of things—a great respect for tradition, mixed with equal respect for the daring it has taken to break with tradition. It's a sharing of the "let's-do-it-better" spirit that keeps the Santa Fe growing *newer* every day.

**PROGRESS THAT
PAYS ITS OWN WAY**



provement program that will increase production of steel plate, sheet and tin plate by 120,000 tons a year.

PORT IMPROVEMENTS—Port of San Francisco builds steel-and-concrete cotton shed at Pier 92 in Islais Creek area, first of a series of modern storage and transport sheds planned by port to serve cotton shippers. At Mission Rock Terminal and other areas, rail switching facilities are being relocated. Conversion and renovation of the Ferry Building in San Francisco at a cost of \$2,000,000 to house a new World Trade Center is scheduled for 1954; plans call for providing a three-story mart in building's north wing, with exhibit halls, offices, shops and restaurants. Five-year total of goods handled by Foreign Trade Zone No. 3 is reported at almost \$30,000,000.

HARVILL-McBAIN—Harvill Corp., Los Angeles, die casting firm, acquires all stock of McBain Corp., Long Beach manufacturer of patented valve controls and industrial valves. Transaction is carried out by stock transfer. Kenneth C. McBain, former president, continues as vice president and general manager of McBain Corp., and R. B. Clevering, Harvill president, assumes presidency of new subsidiary.

CHRYSLER PLANT GROWING—Two new final assembly lines and a body-finishing operation are planned at Chrysler Corp.'s Los Angeles plant and will be in operation by mid-1954. Body-finishing plant will require about 550,000 sq. ft. of floor space in a former plant addition, to be equipped with

facilities for metal finishing, painting and trimming of passenger car bodies. These operations at present are carried on in Detroit plants.

AUTOWARE PLANT IN WEST—New Los Angeles warehouse and shipping plant now under construction for Premier Autoware Co. of Cleveland, O., will be occupied about January 1. Plant will serve Western states, as well as Hawaii and Orient, now served through shipments from main plant in Cleveland.

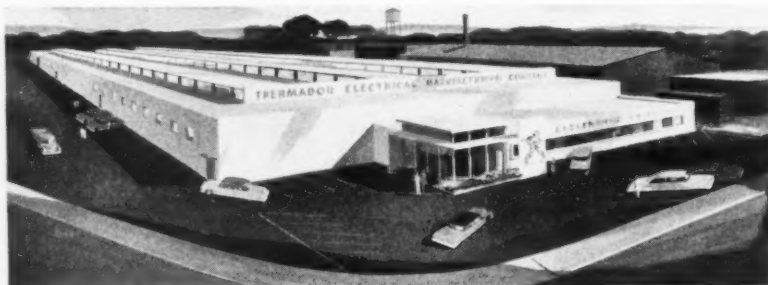
NEW ANACONDA PLANT—Construction begins on new \$1,500,000 plant expansion in Orange for Anaconda Wire & Cable Co., subsidiary of Anaconda Copper Mining Co. An 84,000-sq. ft. industrial building, to be completed by late

April, 1954, will triple present output of rubber-insulated wire and cable. A 15,000-sq. ft. office and recreation building will be completed by June 1. Contractor is William J. Moran Co. of Alhambra.

FURNITURE COMPANY BURNS—E-Z Rest Co.'s furniture plant in Monrovia is destroyed by fire, with an estimated loss of \$50,000. Building and contents, including records, were a total loss.

ELECTRONICS CONTRACT—Newly-organized Ramo-Wooldridge Corp., Los Angeles, is awarded a \$330,000 contract by Thompson Products, Inc., for development of electronic techniques for automatic planning and controlling of purchase, storage and flow of raw

FOR ELECTRONICS DIVISION—New 77,000 sq. ft. plant of Electronics Division of Thermador Electrical Manufacturing Co., Los Angeles, houses transformer tooling and assembly lines formerly at Thermador and motor production lines moved from Alhambra, now part of unified facilities for Thermador electronic equipment.



NEW Rotary Sprayer

Simplifies Cleaning of Tank Truck Interiors

NO NEED TO CRAWL inside hot, slippery, foul-smelling tank trucks to brush and hose-rinse them clean. Now, with the Oakite Rotary Sprayer, you can cut cleaning time 75%; stop water waste; reduce cleaning costs.

The Oakite Rotary Sprayer consists of a small rotating head fitted with six wide-angled flat spray nozzles. It may be positioned on tank truck bottom, tripod supported. Or clamped to manhole and suspended from tank top. Cleaning and rinsing are accomplished by simple valve manipulation.

All information, including low rental charge, plus drawing and specification sheets gladly supplied **FREE** on request. Oakite Products, Inc., 1001 E. First St., Los Angeles 12 or 681 Market St., San Francisco 5.

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Technical Service Representatives in
Principal Cities of U. S. and Canada



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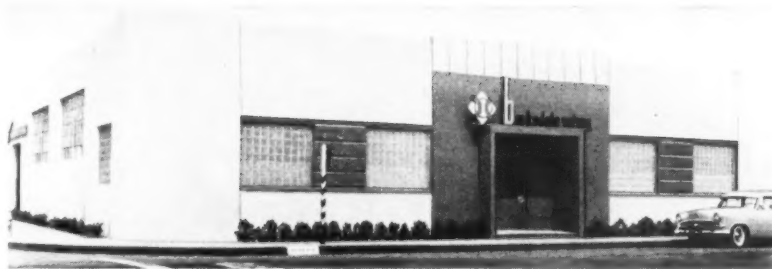
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Modernair CORPORATION

400 PRED A STREET • SAN LEANDRO, CALIFORNIA



NEW PLANT FOR BARKSDALE—Assembly plant and general offices of Barksdale Valves occupy new quarters at corner of Fruitland and Alcoa in Los Angeles. Plant expansion coincides with introduction of new mass-produced hydraulic control equipment.

materials and parts to factory assembly lines. Thompson manufactures automotive and aircraft engine parts.

BREWERY MERGER—Los Angeles Brewing Co., wholly-owned subsidiary, is merged with Pabst Brewing Co. and begins production of parent company's brand of beer in addition to its own. Charles J. Lick, formerly president of Los Angeles Brewing Co., is named as executive vice president in charge of Los Angeles division. Robert Schlaudeman, secretary of Los Angeles, is made Pabst vice president.

OUTPUT BOLTS—Voi-Shan Manufacturing Co., Inc., Culver City, expands with completion of new plating plant, Richmond Engineering Co., Inc., and adjacent to it a new heat treating plant, ARC Heat Treating Co., Inc. An earlier expansion, in 1949, was Aircraft Processes, Inc. Voi-Shan team now has total manufacturing area of approximately 50,000 sq. ft. with facilities for production from raw stock to finished bolt or fastener.

SUB-ZERO WAREHOUSE—Exchange Lemon Products Co. completes new 250 x 160 ft. warehouse at Corona for storage of frozen lemon products. Storage capacity is 1,250,000 cases (24 cans to a case) and 4,500 bbl. of lemon concentrates, in an 834,900-cu. ft. space. Chief storage chamber has constant 10-below temperature. Exchange Lemon Products Co. is a cooperative owned and directed by the 55 lemon-packing houses of Sun-kist Growers in California and Arizona.

WEST COAST BRANCH—M. C. Peterson, general sales manager and assistant to president of Benton Manufacturing Co., Aurora, Ill., states that his company will build assembly plant on West Coast at a future date because of volume of Western orders for steel office furniture.

WAR ON SMOG—New Southern California Air Pollution Foundation sets up headquarters at 621 S. Hope Street, Los Angeles, where it will carry out program of collecting, exchanging and disseminating information on air pollution abatement. Foundation, which is headed by President Fred D. Flagg, Jr., of University of Southern California, will not duplicate services or research of other agencies.

DRY ICE—Brea Chemicals, Inc., will build \$750,000 dry ice plant near company's ammonia plant being constructed at Brea, Orange County. Dry ice will be manufactured from carbon dioxide by-

product of ammonia plant and supplied to refrigeration, metal working, food and chemical industries. Brea is a subsidiary of Union Oil Co.

EXPAND ON WEST COAST—Johnson & Johnson, New Brunswick, N. J., manufacturers of surgical dressings and baby products, plans 100,000-sq. ft. plant in San Mateo County, which will be located on 20-acre plot in Belle Haven industrial area. An affiliate, Personal Products, Inc., has new plant already under construction at Sunnyvale.

BUILD IN WEST—Construction begins on 18-acre site near Southern Pacific railroad in Saugus of glass factory for Thatcher Glass Corp., Elmira, N. Y.

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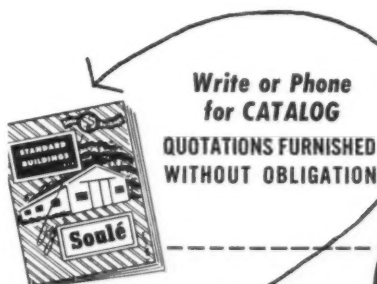
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CNGA FALL MEETING

The California Natural Gasoline Association with its registered membership of over 900 can justly be proud of its vigorous growth. This organization, representing an energetic industry, started in 1925 with a membership of 30.



Vic Fawcett

Any one who has had the pleasure of attending one of its shindigs—be it a golf tournament, a whing ding or a fall gathering—realizes that these boys are among the finest. Having fun or conducting a business operation, CNGA has the enviable reputation of doing the job thoroughly and efficiently.

Held at the Ambassador Hotel, I thought the highlight of its proceedings took place following the banquet when Union Oil Company's Jim Watson ascended to the stage to participate in the entertainment interlude.

Jim has always been highly regarded by his association as a top engineer, but he must have hidden talents that even transcend his engineering ability.

After all out of more than 700 attending the banquet Jim was hand picked from the audience by a most charming and delightful performer—a torch singer. In true CNGA manner Jim handled his job EFFICIENTLY.

It may be hard for any one to figure out where Lufkin fits into this picture, but suffice it to say that in problems of heat transfer, Lufkin's Right Angle Spiral Bevel Gear Reducers, especially designed for aerial coolers, hooked up with a 20 ft. diameter fan, will do wonders in cooling the ambient air—even on a stage.

We are looking forward to CNGA's next banquet—or gathering. Here's to its continued success and growth!

Vic Fawcett

LUFKIN FOUNDRY & MACHINE CO.

PACIFIC COAST DIVISION

3959 S. Alameda St., Los Angeles 1, Calif.

Dallas Lufkin, Texas New York

Plant, to occupy eight buildings, will have initial output of 80 tons a day and employ about 125 persons. Raw materials, principally silica sand from the Mojave Desert and glass scrap, will be delivered on spur track.

PLANT CONVERSION—Westwood operation of Fruit Growers Supply Co. at Susanville will discontinue production of plywood and convert plant to manufacture of Craveneer. Estimated conversion time will be four to six months. Craveneer is a patented box material using wood veneer and heavy kraft paper, licensed by Chicago Mill and Lumber Co. Box production will be used for shipping oranges and lemons.

BOOST OUTPUT—California Metal Enameling Co., Los Angeles, has under way \$150,000 plant expansion to increase production of porcelain enamel products by about 20%. Project will be completed by first of year.

BUY BE-GE—Oliver Corp., San Francisco, acquires in cash sale Be-Ge Manufacturing Co. of Gilroy, to be operated as a wholly-owned subsidiary with present management and plant force. Be-Ge manufactures farm machinery and construction equipment. Its 229,000 sq. ft. plant employs 240 people.

AUSTRALIAN SUBSIDIARY—W. R. Ames Co., San Francisco, forms subsidiary in Sidney, Australia, Ames Irrigation Pty., Ltd., for manufacture of irrigation equipment. Aluminum irrigation tubing is already being produced by new company, which will sell also in New Zealand and South Africa.

REFINERY CONTRACT—Standard Oil Co. of British Columbia, Ltd., subsidiary of Standard Oil Co. of Calif., awards contract to Fluor Corp. of Canada, Ltd., subsidiary of Fluor Corp., Ltd., for engineering and construction of catalytic cracking unit at Burnaby, B. C. Construction, which will start in March, is scheduled for completion next October. Unit is part of a \$10,000,000 refinery program, which will also include facilities for fractionation gas recovery and caustic treating sections. New refinery will have daily capacity of 11,000 bbl. of Alberta crude oil, which will be piped to Vancouver via Trans-Mountain Pipeline. Present refinery at Burnaby, which is supplied by tanker with California crude oil, will close when new refinery is completed by end of next year.

COLORADO

POWER PROGRAM—Public Service Co. of Colorado plans four-year program for new plants and equipment which will cost almost \$57,000,000. Projects ahead include a new \$19,000,000 power plant for Denver area by 1957 and \$10,000,000 for transmission lines, substations and other gas and electric facilities. Generator units are now under construction at Zuni, Alamosa and Arapahoe plants.

ROCKY FLATS—Between 1,000 and 1,200 people are now permanently employed by Dow Chemical Co. at Rocky Flats plant of Atomic Energy Commission. Production at highly classified plant is well under way, according to Gilbert C. Hoover, AEC field manager.

Plant operates under jurisdiction of AEC's Santa Fe, N. M., operations office, which is responsible for research, development, production and testing of weapons.

NEW NAME—Shell Chemical Corp. changes name of its Julius Hyman & Co. division to Agricultural Chemicals division, effective January 1. Change affects sales organization only, and plant in Denver will continue to be operated by Julius Hyman & Co., manufacturing insecticides and agricultural chemicals.

IDAHO

PILOT PLANT SUCCESSFUL—University of Washington chemist, Dr. Ralph W. Moulton, approves results of pilot plant in Wallace, operated by Bernard Wilcox and Lennie Amato, for low-cost production of zinc oxide and zinc metal. Wilcox process has been developed in a series of pilot plants, the latest of which handles up to one-half ton daily. Tests show 70% of zinc is recovered in prime oxide product and more than 25% in salable middling products. Wilcox is one of owners of new firm, Northwest Chemical and Refining Co., which will build \$200,000 plant in Spokane, Wash., for production of 32 to 35 tons of zinc oxide daily.

NEW PARK GETS OPTION—New Park Mining Co. has option to acquire stock in Silver Buckle Mining Co. through cash purchase and exchange of uranium properties, leading to participation in exploration project at Mullan, Idaho. New Park would be operator in project to explore lead-zinc deposits of Vindicator Silver-Lead Mining Co. at Mullan, covered by agreement several months ago between Vindicator and Silver Buckle companies. Defense Minerals Exploration Administration has authorized \$229,500 loan, to be matched by mining companies, for funding project.

GOVERNMENT DAMS—Following dams to be built by government agencies in north-central Idaho are proposed at Corps of Engineers public hearing in Orofino: Penny Cliffs on Clearwater River, \$180,000,000; Bruce's Eddy on Clearwater River, \$125,000,000; Mountain Sheep, Snake River, \$358,000,000. Three dams would produce over 1,600,000 kw. of power and store over 6,000,000 acre ft. of water. Army Engineers would construct Clearwater projects and Reclamation Bureau the Mountain Sheep dam.

IDAHO POWER CO. DAMS—Idaho Power Co., Boise, announces 10-year construction program to triple present hydroelectric power capacity (362,000 kw.). It is estimated to cost \$261,000,000. Approximately \$133,000,000 is allocated for three projected dams and power plants in Snake River, now before Federal Power Commission in Washington, which would have installed capacity of 783,400 kw. and peak capability of over 900,000 kw.

NEW MEXICO

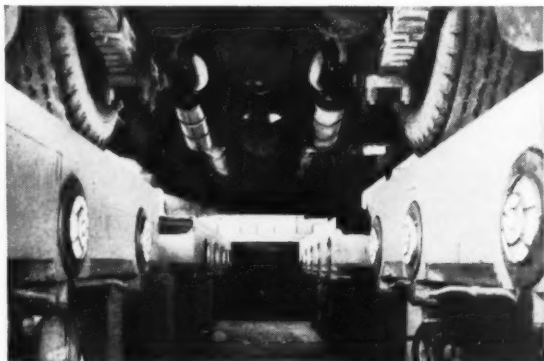
ADD POWER—Public Service Co. of New Mexico orders third boiler for its



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can increase visibility and reduce glare . . . boost productivity as much as 15%. P. G. and E.'s free consulting service will show you how.



Controlled light at work. Explosion-proof fixtures in the greasing pits of the San Francisco Municipal Railway's Kirtland Bus Terminal bend light up to the undersurface of the buses for inspection and maintenance. Recessed within the walls, they leave plenty of working space in the pit. Engineered lighting like this pays off quickly in efficient plant operation.



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PACIFIC GAS AND ELECTRIC COMPANY

12X-53

Person steam power plant at Albuquerque, to be built and installed by Babcock & Wilcox Co., New York. Boiler, which will generate steam to produce 35,000 kw. of electricity, is larger than other two boilers now in operation at Person station, named for its chief engineer, H. A. Person. New unit will be more than five stories high and will not be in operation before November 1954. It is part of a three-year \$22,000,000 expansion program of Public Service Co. of New Mexico.

RECEIVE SHIPROCK CONTRACT—Western-Knapp Engineering division of Western Machinery Co., San Francisco, is awarded \$3,000,000 contract to design, build and equip uranium plant at Shiprock, N. M. Plant is scheduled for completion by December 1954, for Navajo Uranium division of Kerr-McGee Oil Industries, Inc., of Oklahoma City. New plant will treat uranium-bearing ores, using for the first time the acidulation process of separating uranium oxide from carnotite ore, with a vanadium byproduct.

OREGON

MODERN CANDLE PLANT—Northwest Candles, Inc., Portland, completes expansion based on acquisition and remodeling of two adjacent buildings. Firm has invested \$100,000 in new facilities and equipment, among which was candle dipping machinery designed by W. W. Kohl, president, and manufactured locally. Northwest has been in business two years and is largest candle manufacturer on West Coast.

OWNERSHIP CHANGES—Lamson Corp. of Syracuse, N. Y., purchases Mobilift Corp., Portland, and organizes new subsidiary, Lamson Mobilift Corp., which will continue operations without change. Mobilift produces lift trucks and materials handling equipment.

POWER PACTS—Bonneville Power Administration signs interim agreements with Aluminum Co. of America, Reynolds Metals Co., and Kaiser Aluminum & Chemical Co. insuring production of up to 150,000,000 kwh. of power for aluminum production during low-water period by releasing water stored behind Hungry Horse dam. Contracts are for one year on an interruptible power basis. Advance release of storage water will permit aluminum production to be maintained at full capacity.

YATES IN PORTLAND—Yates Boat Co. moves from Beaverton to Portland, where it will occupy three buildings on Commercial Iron Works property for manufacture of small powered craft. Five-year contract has been signed with Beebe Co. for sale of entire output, anticipated to be at least 200 boats a year. Firm has been building boats at Beaverton for five years.

UTAH

MONTICELLO MAY EXPAND—Atomic Energy Commission may allocate \$1,000,000 for expansion of uranium mill at Monticello, San Juan County, adopting sulfuric acid leach methods used by other uranium mills on

Colorado Plateau to permit treatment of vanadium-uranium ores. Monticello mill, one of the oldest in area, now uses caustic soda reduction process. Mill is the only one owned outright by AEC and is operated on contract by Galigher Co. of Salt Lake City.

DIESEL CENTER—General Motors Corp. plans to start building in spring a diesel engine rebuilding plant in North Salt Lake, to cost over \$1,500,000. Facilities will include a main plant, office building, and equipment and furnishings estimated to cost \$900,000. Plant will be one of major centers in country for rebuilding of components of diesel locomotives, traction motors and generators.

HOUSE HUNTING—Kyle and Co., steel fabricating company of Fresno, Calif., is investigating possibility of locating a structural steel fabricating plant in Salt Lake-Provo area. Company is reported to be studying possible plant sites as well as existing operations.

WASHINGTON

HIGH-SPEED TUBE-FORMING—Trentwood works of Kaiser Aluminum & Chemical Corp. begins production of new aluminum tubing of welded seam type, at speeds up to 120 ft. per min., on equipment developed by Yoder Co. of Cleveland. At present, new welded tubing mill will produce primarily irrigation tube in 3- and 4-in. diameters.

PAPER FROM DAMAGED SPRUCE—Inland Empire Paper Co. will increase use of beetle-attacked spruce in manufacture of paper at its Millwood plant next year. Currently, company uses about 25% spruce, not all of it damaged, along with hemlock and white fir. Next year, proportion of spruce will probably reach one-half. Threat to Engelmann spruce by bark beetle has resulted in intensified logging of that tree, and damaged timber has been found suitable for paper making.

MILL RENOVATION—Weyerhaeuser Timber Co. will build complete new facilities at its Willapa branch, Raymond, to be carried out without interrupting production. New units are 20-foot stacker, 10 single-ended dry kilns, 20-ft. unstacker, rough-dry shed, planing mill and storage and shipping shed. As each new facility is completed, corresponding old one will be closed down and removed, making room for another new unit. Work on plant site and utilities will also be carried out.

CHEWELAH COPPER MILL—A 200-ton copper mill will be installed on properties of Chewelah Copper Co. on Eagle Mountain, and is scheduled to begin production early in 1954. Mill is sited on location of old United Copper Co. mill in operation from 1910 to 1920. University of Idaho School of Mines is preparing flow charts for mill operation.

MATCH-MAKING—Diamond Match Co. acquires E. C. Olson lumber holdings, which include E. C. Olson Lumber Co. of Spokane and Kanikau Forest Products Co. of Priest River, Idaho. Stockholders approve exchange of stock, to become effective early in 1954. Corporate names of two companies will

be retained. Properties are reported to have total value of about \$1,000,000. Diamond Match recently built a \$4,000,000 plant at Superior, Mont., and has lumber operations in other parts of Inland Empire.

REORGANIZE—Clinton Foods, New York, closes its Ballard operation at Seattle and its Portland plant, concentrating production in Kent, Wash., for beans, peas and berries; Lynden, Wash., for strawberries and peas; and Lewiston, Idaho, primarily peas. Reorganization will effect production and transport economies. Ben F. Logan, Jr., has resigned, and in future institutional sales will be made by Clinton's Snow Crop office in New York.

BRANCH OPERATION—Graystone Concrete Products Co. buys plant on east side of Lake Washington, in Seattle, of Lakeside Concrete Products Co., and will operate it as a branch plant. William Price, former partner in Lakeside plant, will continue as operating superintendent and present personnel will be retained. New plant manager will be Hugh Watt of Graystone.

GRAIN ELEVATOR PROJECT—Odessa Union Warehouse Co., Spokane, awards contracts for construction of seven concrete grain elevators, with total storage capacity of nearly 1,500,000 bushels. Five units will be built by Larson-Bradshaw, Inc., and two by E. R. Haynes Co., both Spokane companies. New elevators will raise Odessa Union's storage facilities in the Pacific Northwest to nearly 5,000,000 bushels of grain.

POWER FOR CITY LIGHT—Seattle Municipal Board of Public Works authorizes City Light Superintendent E. R. Hoffman to begin formal action on a study of proposed hydroelectric plant on Pend Oreille River in northeastern Washington. City Light will apply to Federal Power Commission for preliminary permit to study the project. Capacity of suggested plant would be within 100,000 and 500,000 kw., depending on whether mining lands could be obtained and flooded.

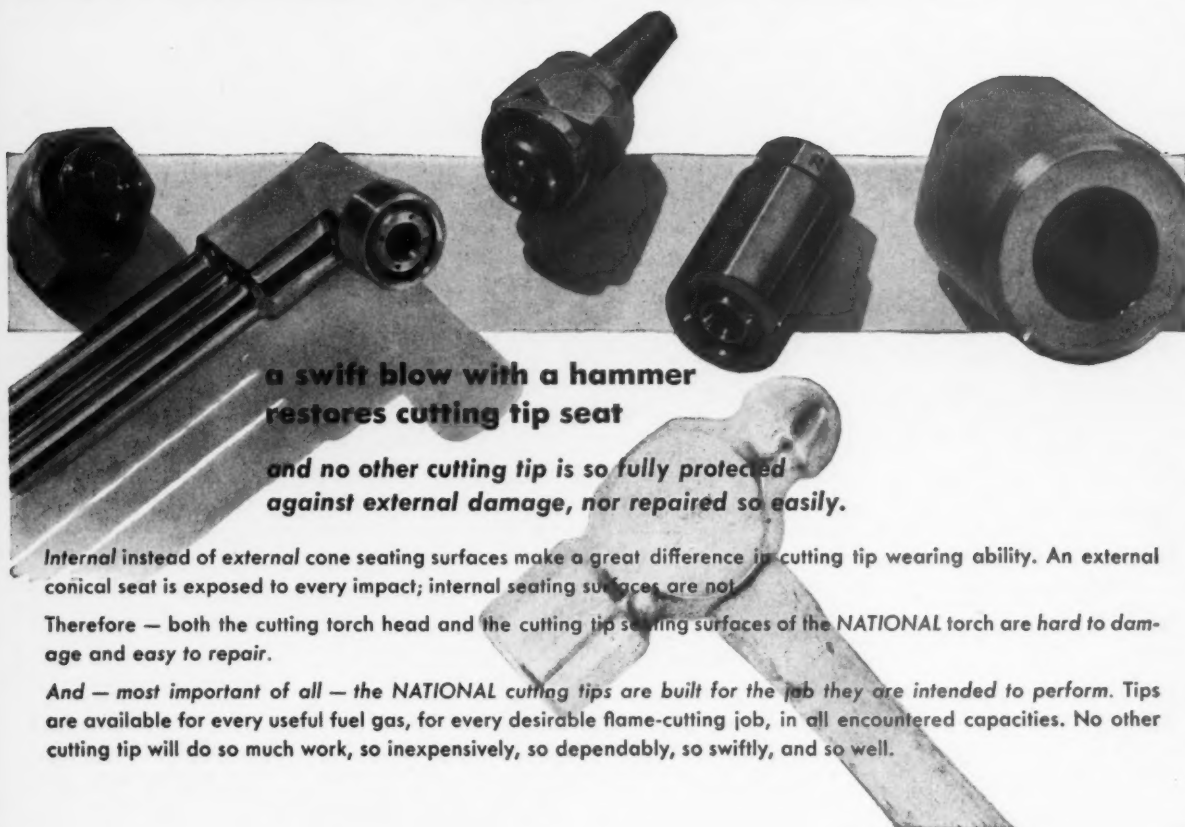
WYOMING

STEP UP RESEARCH—Westvaco chemical division of Food Machinery and Chemical Corp. will accelerate study of leucite deposits at Superior as a long-range source of supply for its successful soda ash refining plant at Rock Springs. Plant, built at cost of \$20,000,000, has solved difficult production problems and is now shipping from 12 to 20 cars of soda ash daily.

RULE AGAINST MILK PRODUCT—Wyoming Board of Agriculture rules that "Winger process" for treating milk to permit storage without refrigeration is in violation of Wyoming statute prohibiting use of foreign substances in dairy products. Plant for production of milk has been proposed for Torrington, Wyo. Another plant is nearly completed at Cortez, Colo., where Attorney General's office has ruled that product is acceptable if it uses Grade A milk. Federal Pure Food and Drug Administration has not yet had an opportunity to review the product.

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